WESTERN EDITION
APRIL • 1957

American Fruit Grower

WEATHER AND CLIMATE
A SPECIAL ISSUE

- Freezes—Do They Occur in Cycles?
- Cloud Seeding to Stop Hail, Start Rain, Stop Lightning
- Great Freezes in Fruit Growing History
- Make Weather Reports Work for You
- The Role of Hardy Understocks
- Why Florida Citrus Is Grown on the 'Ridge'

Fighting Spring Frosts

"We've always had good success with

FIRESTONE FARM TIRES"

says Henry Kunkler, Rte. 1, St. Henry, Ohio

"You read a lot of fancy claims about different farm tires," Henry Kunkler told us, "but we've always had more success with Firestone!"

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Henry Kunkler, Sr., left, shown here with Charlie Schrage of the Wolff Tire Service, Celina, Ohio, Firestone Dealer.

Henry Kunkler, Jr., (right) learns how Firestone's new air measure gauge indicates correct tire inflation regardless of load. The Kunklers' farm tire needs are serviced by Wolff Tire Service.

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Firestone

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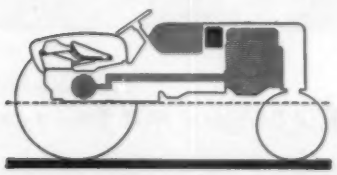

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American Fruit Grower

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The Only National Fruit Publication

Vol. 77 APRIL, 1957 No. 4

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LETTERS
TO THE EDITOR

Florida Grapes

Dear Editor:

I was much interested in your write-up by Dr. John Einset, "Wanted . . . A Better Concord Grape." We have made over 300 grape crosses in the past 10 years, breeding for a southern Concord, one that will ripen and grow down here in the deep South. Have used some outstanding pollen plants and different combinations of crosses over the past 34 years. Our Florida concentrators also want a Concord type of grape.

Altoona, Fla. Dr. Charles Demko

Winter Hardy Grapes

Dear Editor:

I read with much interest the October issue on grapes and would like to bring to the attention of your readers some varieties having great winter hardiness.

The Minnesota Fruit Breeding Farm has introduced the Moonbeam, Red Amber, Bluebell, Bluejoy, and Minn. No. 78. All were derived from Beta crosses. With the exception of the Moonbeam, all have been free of winter injury here during the past 12 years. We live in northwestern Wisconsin where the temperature sometimes drops to —35°.

I have also tested the Seibel No. 1000, the French hybrid mentioned by Mr. Trail (Oct., 1956, p. 18, "Vines . . . Cast upon the Waters" by Guy Trail) and found it hardy to —28°. Its biggest fault here is its late, uneven ripening in a cool season.

During the past 10 years I have been hybridizing and growing grape seedlings. Of the Minnesota grapes I have used, the Bluebell, Red Amber, and No. 78, I have had the best success with the No. 78, a blue grape similar to the Beta except that it is sweeter and of better dessert quality. As its blossoms are pistillate, it is easy to hybridize. I have pollinated it with some of the New York grapes and four of the French hybrids.

My oldest seedlings are Minn. No. 78 x Seibel No. 1000 crosses, and so far they have been winter hardy here. They blossom late with their pollen parent but ripen earlier. Their berries are about the size of the No. 1000 but most are sweeter to the taste. I believe they would be good for wine.

I also crossed one of these seedlings with the Seyve-Villard No. 5-276, another French hybrid, and the winter hardiness seems to be maintained in these second generation seedlings too. Our lowest temperature last winter was —28°. Most of them bore this past summer for the first time and look very promising. Time and further testing will determine their worth.

Nye, Wis. Elmer P. Swenson

A Name for Baby

Dear Editor:

After reading your recent editorial, concerning gas storage of fruits, I could not help but write you. Sometimes, because of low markets, we put our pecans in cold storage. When we take them out, we sell them as "protected pecans." I am not informed as to the legal aspects concerning the marketing of apples, but I do know that the public likes the idea of "protected." I believe that "protected apples" explains what has been done to the apples and would appeal to the public.

Greenville, Miss. William D. Montgomery

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GET *Phix* for the BEST in

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Phix is available from most leading spray chemical suppliers. Insist on *Phix!*

ORDER *Phix* from your dealer early. If he does not yet have *Phix* write, wire, or phone your order to us with your supplier's name.

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with
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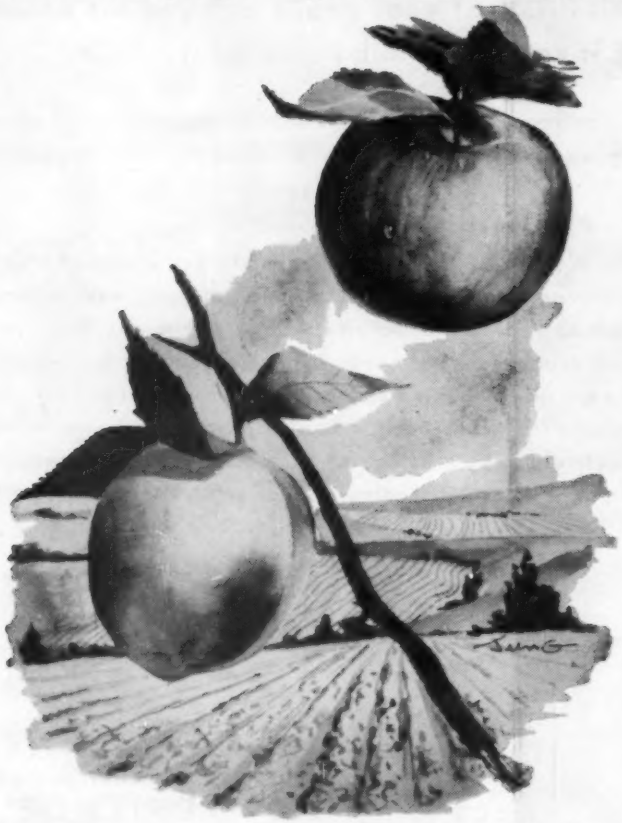

You get cleaner fruit, better yield with this low-cost killer. Phygon®-XL, the orchard fungicide, can sizably increase this year's peach profits at very little cost to you. This easy-to-use fungus killer gives excellent control of bitter rot, California blight, peach leaf curl, brown rot and blossom blight and many other diseases.

Remember, Phygon-XL is the cheapest, most effective fungicide available, not only for peaches but for apples as well, for it controls apple scab and bitter rot. Harmless to pollen and bees, does not affect odor or flavor of fruit.

Order Phygon-XL from your local supplier today. Write, wire or phone us if unable to locate immediate source of supply.

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Naugatuck Chemical Division

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Tufts

Magill

Palmer

Yeager

APS HONORS FOUR

THE American Pomological Society held its annual meeting in December in conjunction with the Kentucky State Horticultural Society in Louisville. As is its yearly custom, Wilder medals were awarded to those who have been of great service to fruit growing.

W. W. Magill, of the University of Kentucky, was recognized for his outstanding service to the fruit industry of Kentucky and adjacent states, and for his untiring efforts to aid all fruit growers, from the young 4-H Club worker to the large-scale grower. "Tubby" has been extension horticulturist in Kentucky for the past 33 years.

Dr. E. F. Palmer, retiring this year as director of the horticultural experiment station at Vineland Station, Ontario, was awarded the Wilder medal for his outstanding work in the breeding and testing of fruit varieties. Dr. Palmer became director of the station in 1916 and from 1934 to 1946 also served as head of the department of horticulture of the Ontario Agricultural College at Guelph.

Dr. Warren P. Tufts, for many years chairman of the division of pomology at the University of California, was awarded the medal for his leadership in horticulture, especially in the Pacific Coast fruit growing regions, and for his keen appreciation of the problems of commercial fruit growing.

The fourth medal winner, plant breeder **Dr. A. F. Yeager,** at present is head of the department of horticulture at the University of New Hampshire and was formerly associated with the North Dakota and Michigan experiment stations. He was awarded the Wilder medal in recognition of his breeding work in fruits and vegetables. His contributions have been of especial value in northern areas.

"NO TIME LOST ...thanks to our Eaton 2-Speed Axle"

...says fruit farmer Alton C. Wendzel, Watervliet, Michigan

"MINUTES COUNT when we deliver a load," remarks Mr. Wendzel. "If part of our crop spoils en route, we're out money. With an Eaton 2-Speed Axle to shoulder the load, we're assured of the ruggedness we need—no breakdowns or delays, ample speeds, quick road trips with minimum expense."

"MANY CUSTOMERS SAVE HUNDREDS A YEAR with the Eaton 2-Speed Axle," reports Mr. C. Creed, Ford truck dealer of Benton Harbor. Talking with Mr. Wendzel *(right)*, Mr. Creed points out that "buying a truck with a standard axle for heavy farming is the same as hiring a boy to do a man's work. For successful farming the Eaton 2-Speed Axle is really needed."

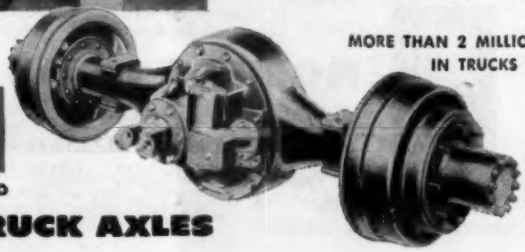
"IF WE couldn't harvest and market in time to meet market peaks," reports Mr. Wendzel, "we'd lose hundreds of dollars. The Eaton 2-Speed Axle gives us the dependability that's essential for fast, profitable trucking.

"Our 175 acres of fruit orchard land are covered with steep hills, soft sandy loam, and often mud. Without an Eaton 2-Speed on our truck, costly delays would wreck our business. But with the low-gear range of the Eaton 2-Speed Axle, we pull out dead-weight loads surely, reliably – keep in step with our pickers.

"When it's time to hustle, our Eaton-equipped Ford is at its best. Eaton's high-gear range speeds a truck load to market when the price is right, returns the truck quickly for another trip. Gasoline costs stay low. Engine wear ceases to be a problem—we haven't spent a penny on maintenance for years. For orchard farming, an Eaton 2-Speed Axle has it over them all."

Whatever you haul, you'll haul it more efficiently and economically with an Eaton 2-Speed Axle. Ask your truck dealer today for a demonstration.

MORE THAN 2 MILLION EATON AXLES IN TRUCKS TODAY



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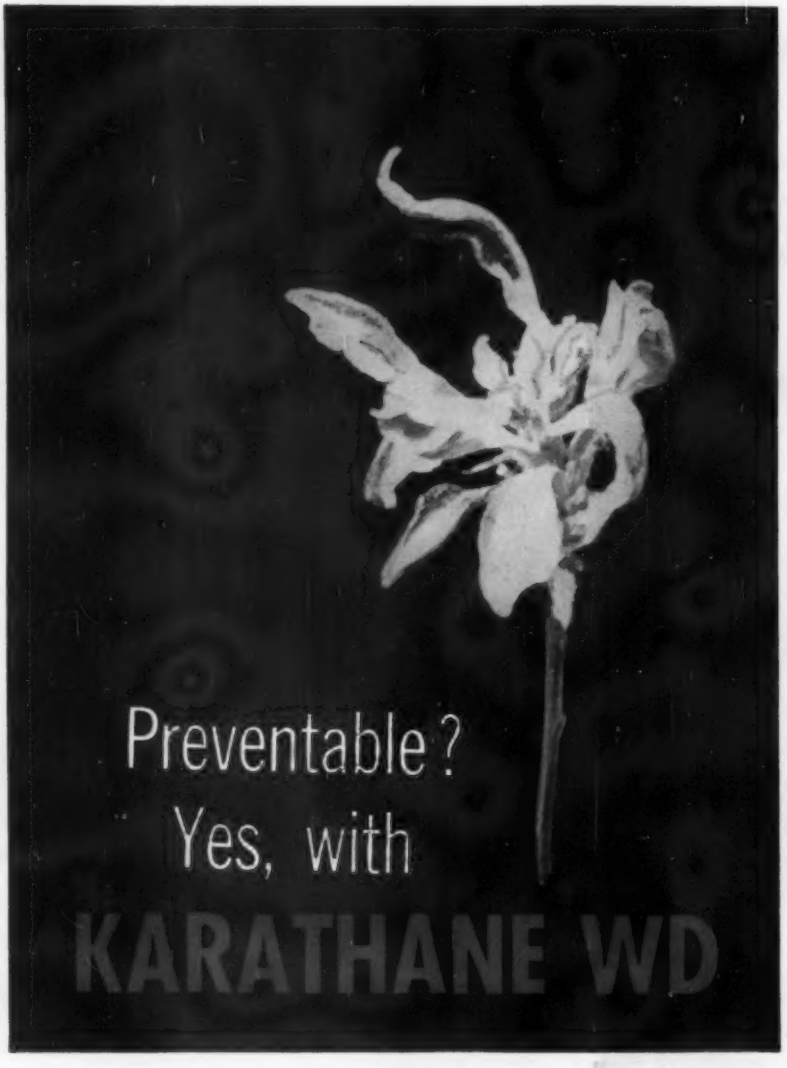
PROJECT ADEQUATE ROADS: Modern roads mean faster, safer, lower-cost marketing. Speak up in your state for improved highways.



Powdery mildew infections such as you see here can kill many blossoms, reduce fruit set, cause russeting, and infect fruit buds. All this can be prevented, and without harm to blossoms, fruit or foliage, by using KARATHANE WD as recommended. In orchards with a history of powdery mildew, you can keep the infection from spreading by spraying KARATHANE fungicide from pre-bloom until the new terminal growth is completed. Other orchards should be sprayed at the first sign of the disease. These sprays will also suppress mite populations. Since mildew infections are hard to wet, be sure to add TRITON B-1956 spreader-sticker to KARATHANE sprays.

OTHER ROHM & HAAS SPRAYS

DITHANE Z-78 stops cedar or quince rust infections . . . helps control scab. Use RHOTHANE (DDD) for red-banded leaf roller, apple maggots, codling moth, other insects. KELTHANE gives quick kill and long-lasting control of European red mites and two-spotted mites.

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CALENDAR OF COMING MEETINGS & EXHIBITS

May 2-3—Shenandoah Apple Blossom Festival, Winchester, Virginia.

June 12—Illinois Summer Orchard Day, at Eckert Orchard Association, Belleville.—Harold J. Hartley, Sec'y, Carbondale.

June 13—Small Fruits Day, Ohio Agricultural Experiment Station, Wooster.

June 17-20—National Apple Institute annual meeting, St. Joseph, Mich.—Truman Nold, Exec. Sec'y, 726 Jackson Pl., Washington 6, D. C.

June 26—New York and New England Apple Institute joint meeting, University of Connecticut, Storrs.—Sherman P. Hollister, Sec'y, Storrs.

Aug. 5-7—International Apple Association annual convention, Netherland-Hilton Hotel, Cincinnati.—Fred W. Burrows, Exec. Vice-Pres., 1302 18th St., N.W., Washington, D. C.

Aug. 13-14—Ohio Pesticide Institute, Ohio Agricultural Experiment Station, Wooster.

Aug. 15—Ohio Orchard Day, Ohio Agricultural Experiment Station, Wooster.

Aug. 17—Summer Field Day, Kansas State College horticultural farm, Manhattan.—William E. Amstein, Sec'y, Manhattan.

Sept. 15-18—Produce Packaging Association 7th annual conference and exposition, Shoreham Hotel, Washington, D. C.

Oct. 9-11—Florida Fruit & Vegetable Association 14th annual convention, Hotel Fontainebleau, Miami Beach.—Florida Fruit & Vegetable Assoc., 4401 E. Colonial Drive, Orlando.

Oct. 24—Nov. 2—National Apple Week.—International Apple Association, Inc., 1302 18th Street, N.W., Washington 6, D.C.

Nov. 14-15—Western Growers Association 32nd annual convention, Hotel del Coronado, Coronado, Calif. Headquarters: 606 So. Hill St., Los Angeles 14, Calif.

Nov. 25-26—Illinois State Horticultural Society and Illinois Fruit Council annual meeting, Abraham Lincoln Hotel, Springfield.—Harold J. Hartley, Sec'y, Carbondale.

NEWS ABOUT VARIETIES

FRUIT growers everywhere will be interested in the American Pomological Society, the oldest fruit organization in America.

All fruit growers are eligible to belong to this society. The primary purpose of the APS is the development of new and better varieties of fruits and the spreading of information to fruit growers about varieties and which ones will perform best in their region. The latest information on fruit varieties is sent to members through the *Fruit Varieties and Horticultural Digest,* a quarterly magazine.

To keep up-to-date on new, early-ripening peach varieties, red sports of apples and pears, sweeter plums, and small fruits which are best adapted to your farm, send your $3.00 for membership to George Kessler, American Pomological Society, Michigan State University, East Lansing, Mich.

WHEN THE TEMPERATURE CLIMBS BE CAREFUL—BE CAREFUL

Temperature, humidity, rain, all seriously affect spraying and dusting. Spray injury can be avoided by understanding five important weather factors.

Send for AMERICAN FRUIT GROWER Magazine's

WEATHER FACTORS CHART

and check weather conditions when spraying. Only 10c each.

"Mr. Big"... for the Biggest Day's Work Ever

New CASE® 8-Speed 4-Plow 400 Orchard-Vineyard Tractor

Here's big, handy orchard-vineyard power in a low, narrow, compact package. The new 8-speed, 50 H.P. Case 400 is more useful now than ever because it has Snap-lock Eagle-Hitch with built-in automatic traction and a full line of mounted implements. There's no need to climb over mounted implements—you step up to the roomy platform from the front. You sit comfortably—lower and farther forward. Steering wheel is lower, while power steering makes the job easier. A foot clutch frees your left hand for wheel and throttle, while right hand operates hydraulic levers.

New Case 400 with tool bar tiller mounted on Snap-lock Eagle-Hitch

Tops in 3-Plow Jobs

CASE® 12-Speed 300 Orchard-Vineyard Tractor

Case 300 is low, short, narrow, easy to maneuver

You're at the head of the 35 H.P. class with the Case 300 orchard-vineyard tractor. Its 12 forward gears—from ¾ to 20 MPH—match every job and load with top-economy engine speeds.

Take spraying or dusting. With three "creepers," you travel as slow as you want, yet maintain proper engine speeds. On PTO-driven machines, PTO speeds remain constant regardless of travel speeds.

New Case Crop-Way Purchase Plan lets you get time-saving, work-saving tractors and implements when you need them, make later payments at times when you have money coming in. Get details from your Case dealer.

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Check below or write in margin Case tractors or implements that interest you. We'll send you complete information. Address J. I. Case Co., Dept. D-137, Racine, Wis.

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☐ Case 300 tractor ☐ Crop-Way Purchase Plan

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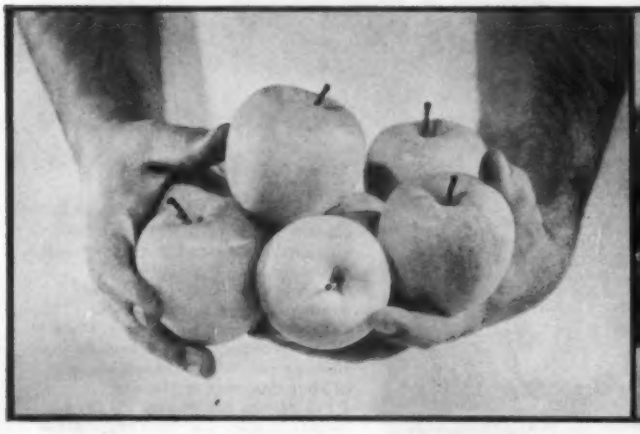
Codling moth, including DDT-resistant strains

protects fruit finish . . . offers safety in use



In 1957, malathion offers *more* than just insect control. Here's how it stops the bugs; fits fine finish programs; gives your workers extra personal protection.

Malathion controls aphids and mites — Make it *basic* in your summer sprays, from calyx well into summer covers. You'll *also control codling moth resistant to DDT, red-banded leaf roller resistant to DDD.* Add a curculio insecticide for a simple, *complete* summer schedule.

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Offers safety in use — *Any* chemical should be handled with care. Malathion makes this easy. Precautions for its safe handling, *unlike* other phosphates, are like those for DDT.

Spray most crops as close as 72 hours from harvest without residue problems! Malathion has high residue tolerance . . . and residues disappear rapidly.

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MALATHION insecticides have many uses on every kind of farm

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American Fruit Grower
• Fruit for Health •

Good air and water drainage is a major factor to consider in selecting an orchard site. Checking the area on critical nights with recording thermometers before planting is a wise practice.

FREEZES... Do They Occur in Cycles?

Records show that freezes follow a relatively definite pattern — one that growers cannot afford to ignore

By FRANK STREET

"WHAT has been, will be." This classic statement is recorded in "Eighty Winters in Michigan Orchards," one of the greatest bulletins ever written for the peach grower.

The existence of irregular fluctuations in weather of sufficient severity to cause severe damage to peach trees and buds has long been confirmed. These can take many forms, such as severe winters of protracted cold; early fall freezes before the trees reach maturity; late spring freezes following warm winters; quick thawing of frozen trees from reflected light off the snow occurring at the two o'clock spot; spring frosts; excessive rainfall in late summer and fall which delays maturity of the trees; severe drought, etc.

It is interesting to speculate when this damage is likely to occur. Winters of protracted cold in the Midwest have occurred at intervals of approximately 19 years—1865, 1885, 1899, 1918, and 1936. Are we overdue for another?

Throughout many sections of the Midwest in 1950 rainfall was the highest ever recorded. The first killing frost did not occur until November 5 and many of the leaves were still on the trees on November 24. The Thanksgiving Day freeze of 1950 will long be remembered throughout the Midwest as killing and damaging more trees than any other freeze in our memory. Michigan fruit growers can never forget the October 11 and 12, 1906, freeze. They had had a similar experience in 1869. Yet can we say that fruit growers can expect one of these disastrous fall seasons at intervals of approximately 40 years? Much evidence could be assembled to either prove or disprove this contention.

A keen observer of weather, Frank Street applies his knowledge of meteorology in the successful management of his Cardinal Farms orchards, an outstanding peach operation in Henderson, Ky. —Ed.

Best remembered, because it is most recent, is the March 27, 1955, freeze. Spring freezes have occurred in many sections on many occasions. There is no pattern that can be found from our present data to predict the years in which they will occur.

One unusual spring freeze of local interest is worth recording. One hundred years ago the grape industry was of major importance in the bluegrass section of Kentucky. On May 1, 1862, a devastating frost killed every vineyard in the area. The Civil War was on, burley tobacco was just coming into prominence, so the grape industry was never re-established in that area.

From the above record, it should be clear that tragedy is most likely to hit at least once in the life of any block of peach trees. We are concerned with what can be done to mitigate the damage.

The first consideration is to go into the commercial peach business in a proven region. The second is to select a site with good air drainage, avoiding low areas where ripening of the wood is delayed and lowest temperatures occur. Altitude above sea level means nothing, but elevation of the surrounding land is all-important. Checking the area on critical nights with recording thermometers before planting will yield vital information.

Third, the proper crotch formation is of utmost importance. This is vividly brought out in the new bulletin from Purdue University, "The Forward Look in Peach Pruning," by C. L. Burkholder.

The greatest destruction that has occurred in peach orchards has been done in years when heavy rainfall has induced late growth and low winter temperatures have followed. This was the pattern of the 1950-51 season in the Midwest.

Lack of ripeness of the wood has been the greatest factor in damage to

(*Continued on page* 38)

The number of orchard heaters needed per acre depends among other factors on the frost hazard of the orchard. From 35 to 50 nine-gallon heaters is an average.

FIGHTING SPRING FROST *In the West*

Here is a review of some of the methods used. Heating with oil remains the most practicable for deciduous orchards

By WILLIAM J. ROGERS

U.S. Weather Bureau
Fruit-Frost Service
Pomona, Calif.

TODAY, with our increasing emphasis on quality fruit and higher production and with our orchards spreading out into areas of higher frost hazard, frost is more of a problem than ever before.

Some orchard locations are particularly susceptible to frost and suffer frost damage practically every season, while some other locations sustain damage very rarely. Generally, locations on low ground have a high frost hazard; but being on high ground is no insurance against frost. Although hillside slopes with good drainage have a relatively low frost hazard, a pocket on such a slope out of which the cold air cannot drain at night can present a difficult frost problem, and a flat or gently rounded hilltop location can be just as cold as any low ground orchard.

It would seem only logical that the best and most efficient method of frost protection would be to avoid planting tender crops in locations with a high frost hazard. Where the Fruit-Frost Service's microclimatological surveys of a district are available, considerable money can be saved by studying these surveys and then planting hardy crops in frosty locations and avoiding the planting of tender crops where the frost hazard is high. However, planting in warmer locations is not always feasible.

Where protection is deemed necessary, the method which has proved most successful, cheapest in the long run, and most reliable over the years is heating with oil. Usually, 5- or 9-gallon open containers are used, with some sort of fitted cover for extinguishing and regulation.

The number of heaters needed will depend on the frost hazard of the orchard and on other factors, but from 35 to 50 nine-gallon heaters is an average density. Diesel oil is the usual fuel.

Where urban encroachment on agricultural areas has made the smoke from these heaters objectionable (and open heaters are *very* smoky) more modern stack-type heaters are being used. Such stack heaters are no more efficient than the open-type heaters in protecting the orchard and cost much more initially. The only reason for their use is to reduce smoke.

Closeup of a stub-stack heater. The cap on the stack is used to extinguish the heater.

The basic techniques used in heating with oil have not changed much through the years, but some changes in operating methods have occurred. With heating costs up, both for oil and labor, growers must walk a very narrow line between wasting their oil and labor on one hand, and being so parsimonious with their oil that they lose fruit by lighting too little or too late. This places a premium on knowledge of orchard heating techniques and on careful operations.

During radiational frosts, temperatures are lowest near the ground

(*Continued on page 37*)

Lenzgroup

A big weather hazard in the Hudson Valley of New York is hail. Damage to fruit crops in the 1000-square mile area in 1954 reached a staggering 75%; in 1955, 15%.

Last year 260 anxious growers decided to fight back against nature. Uniting as Hudson Valley Crop Services, Inc., they employed the services of Weather Modification Company, San Jose, Calif., to seed ominous clouds with silver iodide, to cause rain to fall instead of fruit-shattering hail.

The generator shown in photo at right was one of 80 ground generators set up in the mountains and around the fringes of the valley. Radar scanned the horizon for 90 miles searching for storm clouds. A P-40 pursuit plane equipped with radar and generator seeded clouds from above while they were still out of ground generator range.

Practically no hail hit the valley in 1956. Whether this was due to weather control will not be known until the project has been tested for several years.—Ed.

Will CLOUD SEEDING . .

• STOP HAIL?
• START RAIN?
• PREVENT LIGHTNING?

By R. T. MEISTER
Editor

WHAT is the future for weather modification? Can scientists cause it to rain more—or less—on one area than would normally occur? Can devastating, crop-ruining, hailstorms be turned aside?

Some weather scientists say weather modification is feasible; others are inclined to be doubtful.

Those who take a restrained point of view, such as the U. S. Weather Bureau, say:

1) There must be suitable moisture-bearing clouds available for cloud seeding. Obviously, then, cloud seeding is not a cure for drought.

2) It has been possible to say definitely that cloud seeding has increased precipitation only under very favorable circumstances, such as where moist air currents are forced to rise and produce persistent clouds. These circumstances usually occur over mountain ranges in the West. Under these favorable circumstances an increase in precipitation is only 10 to 15%.

3) More research is necessary to learn how clouds release their moisture naturally before the effectiveness of artificial methods can be definitely known. One point of view holds that conditions under which it appears possible that cloud seeding might cause an increase in precipitation are almost exactly the same as those required for natural release.

On the other hand, Dr. Irving P. Krick, whose Water Resources Development Corp. has conducted cloud seeding work for almost a decade, says:

1) Unlike other natural resources, such as iron ore, the world supplies of water cannot be depleted. Our water supply is continuously moving through the hydrological cycle, from the atmosphere to earth as precipitation and by evaporation back to the atmosphere. It is an astounding fact that we are using the same water that prehistoric man used.

The problem is to adjust and modify the water supply through precipitation to best fit our needs.

2) It is true that cloud seeding cannot produce rain but it can assist the natural processes and thereby obtain greater yields in desired areas.

3) In the wheatlands of eastern Washington, five successive years of cloud seeding have obtained from 6 to 14 more inches of rainfall than adjacent areas. On a cost basis, $1 spent on weather modification added $40 in income to farmers through increased yields.

4) Hail cannot be eliminated but it is possible through cloud seeding to suppress it and minimize potential damage. Hail suppression programs will increase precipitation and at the same time suppress lightning, thus saving timberlands from fire.

Meanwhile it is interesting to note that cherry growers in Yakima, Wash., recently went on record favoring a bill which would provide regulation of weather modification. They are worried that the attempts to increase rain on adjacent dry land wheat farms will ruin their cherry crops. THE END.

History Records These GREAT FREEZES in Orchard Areas	
GEORGIA	1828, 1849, 1894, 1955
FLORIDA	1835, 1894, 1895, 1899, 1940
MICHIGAN	1899, 1906, 1950
NEW YORK	1917-18, 1926-27, 1933-34, 1957
CALIFORNIA	1922, 1948-49, 1913, 1937
TEXAS	1930, 1949, 1951
IOWA	1940
WASHINGTON	1955

Great Freezes

LESSONS MICHIGAN GROWERS LEARNED FROM THREE UNUSUAL FREEZES

By **STANLEY JOHNSTON**
South Haven (Mich.) Experiment Station

WHILE injury to fruit trees has occurred in the Michigan fruit belt in a significant degree about twelve times in the last 110 years, three instances stand out because of the extent of the damage and their dramatic nature.

February, 1899. Until late January, the winter of 1898-99 had been an ordinary one. Then from January 26 to February 14, a cold wave gripped a large part of the United States in the lowest temperatures on record. On February 9, it was —22° at the South Haven Experiment Station, the lowest official reading ever occurring there. The temperature was —33° at Traverse City.

There was only a light covering of snow in southern Michigan. Without snow protection the long-sustained, severe cold froze the ground to great depths in many places causing enormous damage to fruit trees. Fruit growers were so depressed that the winter meeting of the state horticultural society was cancelled because of the "dampened horticultural spirits."

In the spring, injured trees started to send out leaves and growers' hopes were momentarily revived, but they were later convinced of the truth of the observation that damage to fruit trees caused by a severe freeze cannot be seen all at once but becomes gradually apparent for several years.

The great lesson learned by fruit growers in Michigan from this freeze was the need for adequate ground cover to prevent root freezing.

October, 1906. Until October 10, 1906, the apple harvest was progressing in Michigan, there were many peaches of late varieties still on the trees, and grape vines were carrying hundreds of tons of fruit when a heavy snowstorm occurred, followed by an unseasonal low temperature. The official temperature at South Haven the morning of October 11 was 15° but readings farther inland from Lake Michigan as low as 6° were reported.

The damage caused by this early autumn cold wave was enormous. Not only were great quantities of unharvested fruit ruined, but millions of fruit trees were destroyed. About 73% of Michigan's 7,500,000 peach trees were killed. Thousands of trees of other kinds of fruit were killed and many more so seriously injured that they were of little value after the freeze.

This cold wave became known as the Big Freeze among Michigan fruit growers. It was of the "freak" type against which little can be done in the way of preventing injury. It clearly demonstrated the great damage that can be caused by a moderately low temperature occurring while trees are still in leaf.

November, 1950. During the night of November 24, 1950, an extremely severe cold wave crept into the western Michigan fruit belt from the northeast. No protection was afforded by Lake Michigan as the cold came from inland. Temperatures that night ranged from —10° to —21° in southwestern Michigan.

Photo above was taken on October 10, 1906, on what was then the Uriah Leonard farm, near Watervliet, Mich. Apple tree at left is still carrying a crop of fruit. In addition to heavy snowfall, temperatures dropped to 6° in some places. This freak freeze was the most destructive in Michigan fruit growing history.

It is estimated that about half of Michigan's peach trees died or broke down within the next few years as a result of this freeze. There was also considerable trunk injury on plum and sweet cherry trees and great damage to raspberry canes.

While the damage from this freeze was great, it is amazing that it was not more extensive when such extremely low temperatures in November are considered. Two factors helped keep the injury from becoming much greater; the fall had been dry, causing trees to mature early; and a 3-inch snowfall coming ahead of the severe cold prevented serious root and collar injury. THE END.

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COMPARE STYROFOAM	INSULATIONS			
	STYROFOAM	A	B	C
Low "K" factor	X		X	X
Superior water resistance	X	X		
High compressive strength	X	X		X
Light weight	X		X	
Superior resistance to rot and vermin	X	X		
Easy handling and fabrication	X			
Low-cost installation	X		X	
Lowest cost per year service	X			

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YOU CAN DEPEND ON DOW

State NEWS

- **Red Tart Cherry Growers Form Bargaining Association**
- **Peach Buds Reported Killed in Some New England Areas**

Virginia Votes

VIRGINIA—Apple growers of the state are holding a referendum to determine whether a sufficient number are willing to increase the levy for apple advertising and promotion. At present it appears possible that growers will approve the increase.

J. B. Bonham, Sr., Chilhowie, was elected president of the Virginia State Horticultural Society. He is a senior member of the firm of Bonham Brothers, apple growers and processors.

Walker McBond, past president of the society, president of the Frederick County Fruit Growers Association, Winchester, and an outstanding citizen of Frederick County, died February 9.—*John Watson, Sec'y, Staunton.*

Cherry Bargaining Co-op

MICHIGAN—If plantings of young cherry trees are any indication, the production of red tart cherries in the United States will be on the increase. From 90 to 95% of this elegant fruit is grown in the five eastern states of Michigan, New York, Wisconsin, Pennsylvania, and Ohio. The past 10-year average production is about 125,000 tons, of which approximately 95% is processed.

As the tart cherry industry grows and becomes a major fruit industry, it faces a number of problems. The primary one over the past few years has been the wide fluctuation in cherry prices at the grower level. Cherries sold as high as 11 cents per pound in 1954 and then dropped to 5 cents per pound in 1955; wide variations also being evident in processor prices to the trade. This has made an unhealthy condition for profitable large volume movement of cherries.

Co-op Planned

Acting on the request of growers and the needs of the industry, the National Cherry Growers Council in June 1956, set up a committee to put together the necessary working parts of a cherry growers' bargaining association. The committee was composed of growers from the five eastern cherry producing states and Arthur Howland, of Michigan State University, and Lyman S. Hulbert, attorney, Washington, D.C. Grower contracts, articles of incorporation, and by-laws were drawn up and processor contracts were outlined. An overall marketing co-op dealing with the raw fruit for the five states was incorporated at Lansing, Mich., in December, 1956. This new association has been called the Great Lakes Cherry Producers Marketing Co-operative, Inc.

An active membership campaign among growers began in January. The group will not bargain with less than 40% of the non-co-op (or processor owned) tonnage in the states. One-half of this amount was signed up at the end of February. The balance needs to be signed soon to put the plan into operation this year.

The membership elected directors in late March. The first responsibilities of the newly elected board will be the hiring of a manager, followed by the gathering of economic data on supply and demand relationships for red tart cherries.

What will a bargaining association offer the red tart cherry industry? For the grower—a voice in the selling price of his cherries; for the grower, processor and consumer—a reasonable price based on economic factors of supply and demand, plus a firm, growing industry, and less fluctuation in prices.—*George McManus, Jr., Dist. Marketing Agent, Traverse City.*

Spotlight on Marketing

INDIANA—The Indiana Horticultural Society recently completed its 96th annual winter meeting. An interesting aspect of the marketing sessions (one an open forum discussion on "What Happened to the 1956 Apple and Peach Deal in Indiana," moderated by society president Max Kercher), was that attendance was better than in some production sessions. This seems to indicate that growers are alerted to the marketing aspect of the fruit industry.

Speakers were Carroll R. Miller, who discussed "Who Sets the Price of Apples," and M. Stanley Pine, manager, Garden State Fruit Growers, Inc., of Freehold, N.J., who told about "Pooled Grower Sales."

Indications are that sub-zero temperatures damaged 10 to 30% of the peach buds in the southern part of the state. Growers in central Indiana report 50 to 90% injury, while reports from the northern lake region are too scattered to form any conclusion as yet.

Albert C. Hainlen, retired 81-year-old apple grower of Converse, was killed recently in a car-truck collision in Marion.—*George A. Adrian, Sec'y, Indianapolis.*

Deep in the Heart of . . .

TEXAS—The Rio Grande Valley Horticultural Society met recently at Weslaco for their 11th annual institute. About 350 people attended.

E. M. Goodwin, of Mission, was presented the Arthur T. Potts award in recognition of his outstanding work and interest

(*Continued on page* 18)

FRUIT PEST HANDBOOK

(FIFTY-EIGHTH OF A SERIES)

GRAPE ROOTWORM

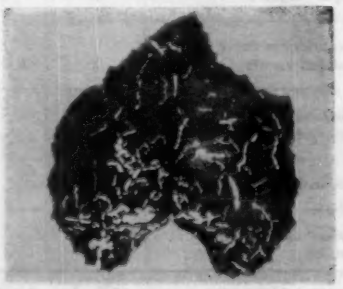
THE grape rootworm, a small, hairy, chestnut-brown beetle about one-fourth inch long, is a common pest of grapes from the Mississippi Valley eastward. The presence of the insect is indicated by the occurrence of characteristic narrow chainlike feeding areas of the adults on the upper surface of the leaves. The larvae feed on the roots, devouring more or less completely the smaller roots and rootlets and eating pits and burrows into the larger roots. The result is a weakening of the vines and reduction in yield. Normally the feeding injury of the larvae is much greater than that of the adults.

The grape rootworm spends the winter in the larval stage in the soil, usually at a level below the feeding area. In the spring the overwintering larvae move nearer the surface and resume feeding on the roots. Pupation usually occurs late in May or early in June, and the adults emerge at, or about the time, the grapes are in bloom.

After feeding a short time the adults begin to lay eggs beneath the loose bark on the vines. The eggs hatch in one to two weeks and the newly hatched larvae drop to the ground and enter the soil to begin their feeding on the roots. This continues until cool weather in the fall causes them to move deeper into the soil for the winter. There is normally one generation a year.

Control*—Spray the foliage and vines with 1½ pounds of a 50% wettable DDT powder in 100 gallons of water when the first feeding injury is noticed on the grape leaves. A second application about 10 days after the first may be needed if infestation is heavy.—*Howard Baker, USDA.

Adult form of the grape rootworm.



Typical injury to grape leaves caused by the feeding of adult rootworms.

Photos courtesy USDA

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Long residual saves you costs of additional sprays. Aramite is easily applied, compatible with sulphur and many other insecticides and fungicides. Aramite does not kill natural predators.

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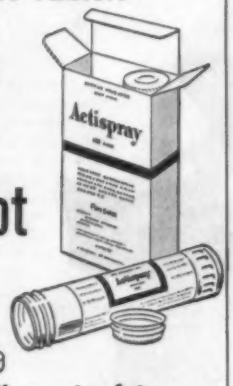

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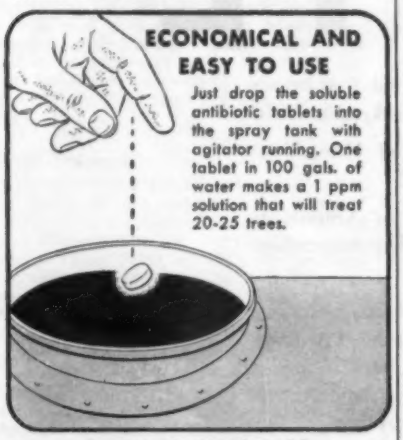

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STATE NEWS

(*Continued from page* 16)

in developing and promoting the citrus industry in the valley.

The program included outstanding speakers. Col. K. M. Smith, special water master of the Falcon Compact, pointed out the seriousness of the water shortage. Dr. A. M. Boyce, director of the Citrus Experiment Station, Riverside, Calif., discussed the problems of research; Dr. Wilson Popenoe, director, Escuela Agricola Panamericana, Tequcigalpa, Honduras, discussed avocados and other subtropical crops. He suggested the Jule mango as a promising type for the valley. Dr. C. H. Wadleigh, of the USDA, discussed soil management and proper utilization of water. Dr. Frank Cullinan, also of the USDA, showed how co-operation between state and federal research agencies could benefit everyone concerned.

Officers of the society are Dr. George P. Schulz, president, and Dr. George P. Wene, secretary-treasurer.—*George P. Wene, Sec'y, Weslaco.*

New Plantings

TENNESSEE—Interest indicated by the calls for help with new orchard plantings provides our only news at present. While the acreages in the main are small, the plantings are widespread and are geared to marketing outlets. Both peach and apple plantings are divided almost equally between early varieties for northern markets and later varieties for local outlets.

Bud potential in most mature apple plantings indicate an average crop despite last year's overload. While there are ample peach buds for a fair crop, the fruiting wood is short, generally, except where trees were well thinned or irrigated. West Tennessee suffered a prolonged late summer drought.—*A. N. Pratt, Sec'y, Nashville.*

'Open' Winter

IOWA—There was little moisture during February, and a somewhat open winter has made it possible for growers to take advantage of the weather and get an early start on spring pruning.

Scale and mites have been a serious problem in a number of orchards in recent years and in all probability quite a lot of dormant spray will be used.—*R. Glenn Raines, Sec'y, Des Moines.*

Blueberry Injury

NEW JERSEY—Although there has been fruit bud killing of blueberries in one area of the state, the crop should not be reduced appreciably. As of the end of February all fruits except blueberries appeared to be in good condition. In some low areas there has been minor peach bud killing but in general, peach buds are in good condition.

Lester Collins, one of New Jersey's most beloved and respected agricultural leaders, died on February 8, following an illness of several months. He was a strong supporter of the horticultural society and was instrumental in the founding of the New Jersey Peach Council and the New Jersey Peach Industry Committee. His active association with the New Jersey Agricultural Experiment Station was extremely helpful to horticulture.

Joseph F. Hauck, assistant chairman of the agricultural economics department and extension specialist in marketing at Rutgers University, died February 5. Joe was known to most horticultural society members because of his active programs involving fruits and vegetables.—*Ernest G. Christ, Sec'y, New Brunswick.*

Peach Buds Killed

NEW HAMPSHIRE—The weather was very favorable for the 63rd annual meeting of the New Hampshire Horticultural Society held in Concord in February but we can't say that weather this winter has been kind to the fruit industry. Temperatures as low as 27° below zero killed all peach buds and did considerable damage to peach trees. No serious damage has been reported to apple trees although the less hardy varieties such as Baldwin and Gravenstein that produced heavy crops in 1956, will likely show some wood injury later this spring.

New officers of the Society for 1957 include E. C. Leadbeater, Contoocook, president; Elwin Hardy, Hollis, vice-president; Robert Cornelieusen, Derry, treasurer; and E. J. Rasmussen, Durham, secretary.—*E. J. Rasmussen, Sec'y, Durham.*

9° Below in Maryland!

MARYLAND—Some peach bud injury has been reported along the Eastern Shore where the unusual of 9° below zero was registered. The rest of the state appears in good shape.

Pruning is lagging due to stormy weather.—*A. F. Vierheller, Sec'y, College Park.*

Average Date and Latest Recorded Occurrence of 32° TEMPERATURE In Spring Months in Important Fruit Areas

City and State	Average Date of Last Occurrence in Spring	Latest Occurence of Record in Spring
Yakima, Wash.	Apr. 19	May 19
Salem, Ore.	Apr. 14	May 26
Fresno, Calif.	Feb. 4	Apr. 13
Spartanburg, S.C.	Mar. 29	Apr. 17
Ft. Valley, Ga.	Mar. 15	Mar. 20
Winchester, Va.	Apr. 19	May 4
Rochester, N.Y.	Apr. 28	May 27
Carbondale, Ill.	Apr. 14	Apr. 26
Jefferson, Ohio	May 3	—
Boise, Idaho	Apr. 29	June 16*
Concord, Mass.	May 10	June 21

U.S. Weather Bureau

*1895.

Won't Err Twice

CONNECTICUT—Fruit growers met March 13 at the Connecticut Experiment Station in New Haven to discuss the mistakes of the 1956 spray program and to plan for 1957. Prof. P. L. Putnam called attention to social security, income taxes, and life insurance and how these factors have a bearing when transferring the farm to the son.

Growers visited the Lymans Farm in Middlefield in March to see a block of Delicious "snip pruned."

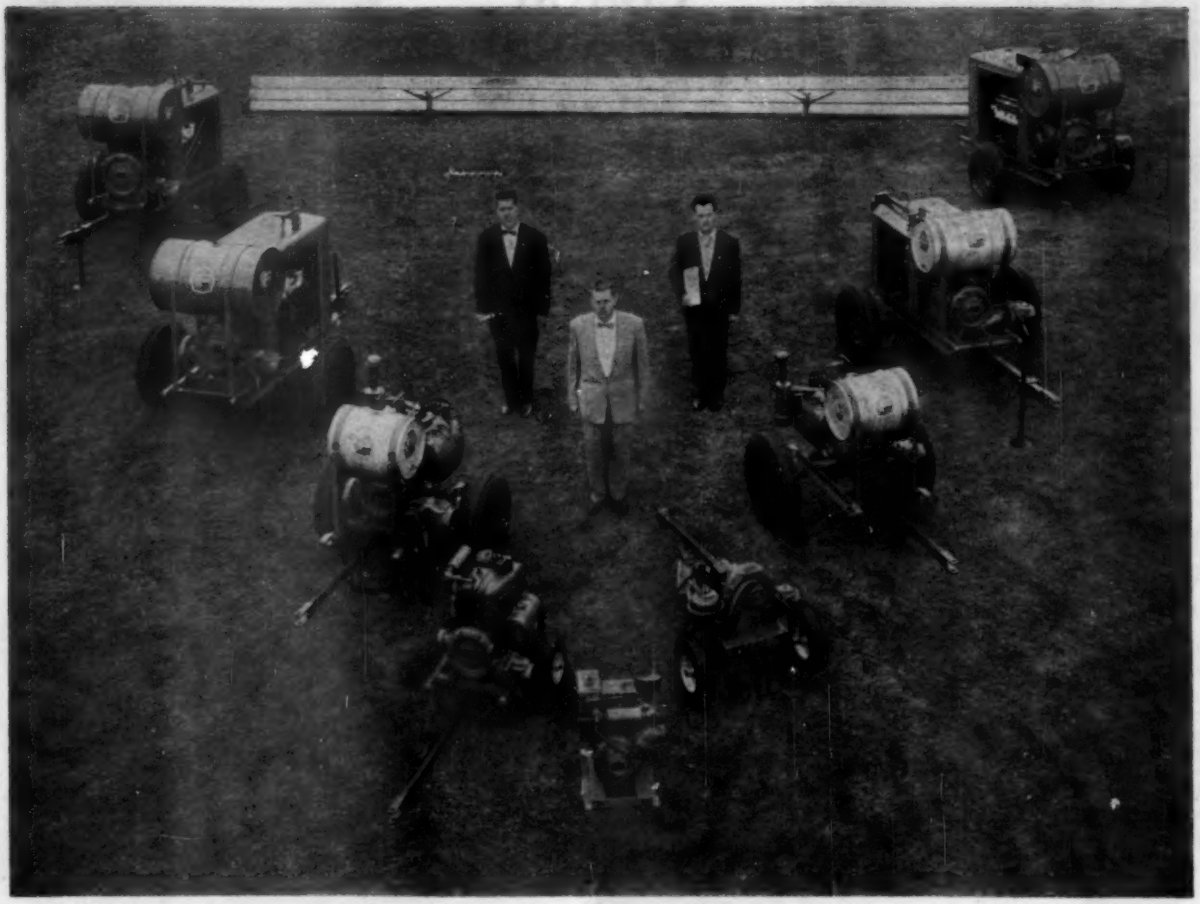
Peach buds have all been killed except for a few along the shore. Growers are warned to go light on pruning and nitrogen until the amount of damage is determined. —*Sherman P. Hollister, Sec'y, Storrs.*

Ask Federal Aid

OREGON—Governor Robert D. Holmes has asked President Eisenhower for aid to Umatilla orchardists who suffered losses of 95% of the county's 4550 acres of orchards in the late 1955 freeze. Unless Federal aid is forthcoming, it is estimated that only 2350 of the lost acres will be restored to production.—*Harold and Lillie Larsen.*

'Haven' Peach Plantings

KANSAS—About 15,000 peach trees have been planted in the vicinity of Wichita. The Haven series are the principal varieties used, including a start of both Sunhaven and Richhaven.—*W. G. Amstein, Sec'y, Manhttan.*



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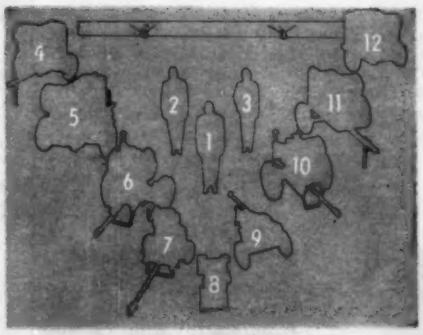

Pictured are (1) Mr. G. Wesley Cadman, (2) Mr. Arthur L. Cadman, (3) Mr. Andy Kesteloot of Cadman Power Equipment Co., Courtland, Ontario. Gorman-Rupp Irrigation Pump models shown are: (4) 55A-265, (5) 55B-IND30, (6) 54A-VG4D, (7) 53M-TFD, (8) 6201, (9) 64A-G, (10) 53H-VF4D, (11) 54M-CJ3A, and (12) 55M-IND56.

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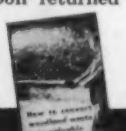

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PEACH GROWERS MEET

NPC delegates report on weather and 1957 peach crop conditions

By R. T. MEISTER
Editor

THE National Peach Council, representing all the peach growers of the nation with one voice, held an interesting and profitable meeting at St. Joseph, Mich., in February. Growers attended from every commercially important peach state. Grower delegates estimated the size of the 1957 crop at slightly under 70 million bushels or about 10 million bushels more than the five-year average of 1952-56.

Bumper Cling Crop

The biggest reason for the increase is the estimate on a bumper crop of clingstone peaches in California, up 8 million bushels over the five-year average. For fresh market there will not be an above-average crop.

In the Southeast, insufficient winter cold will cut production in the more southern peach sections. Temperatures from 15 to 20° below zero reduced New York state's crop to 20%. Washington and Idaho peaches have also been severely injured by low temperatures. At the time of the meeting conditions in Oregon and California were excellent. Drought conditions in Kansas will prevent much of a crop. It was reported that whereas Kentucky is not planting peaches and production is expected to go down, new plantings will increase crops in the Carolinas, Georgia, Alabama, and Arkansas.

Growers were pretty well agreed concerning irrigation (not insurance against drought but an important part of growing peaches year in and year out) and hydrocooling (you can't sell peaches without it).

On the subjects of pruning and packaging, there was considerable disagreement. Growers advanced different ideas on how to start young peach trees and how to prune bearing trees. However, most growers stressed that wide-angled crotches are essential to avoid winter injury.

Packaging Opinions

Opinion was divided on packaging. Following the widespread use of hydrocooling and picking more mature peaches, emphasis now is on a package which will give adequate protection to the tender peach. One point of view, presented by Grant Fox, of Ontario, Canada, favored a smaller package. He is using a two-layer California lug with each peach in a crinkle cup. On the other hand, Ken Williams, of LaPorte County, Indiana, said that although they had tried many new styles of packages, they are still using bushel baskets and intended to again in 1957.

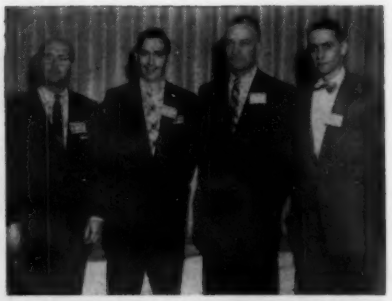
Peach states where growers have joined together to promote peaches and who reported at the meeting included Illinois, Pennsylvania, Colorado, California, South Carolina, and Michigan. Harold Hartley, new secretary of the National Peach Council, reported that if all states contributed their full assessment, the National Peach Council would have around $10,000 to spend in 1957 on peach advertising.

Under the auspices of the American Farm Bureau Federation and the National Peach Council, a meeting was held between Canadian and U. S. producers to discuss problems common to both countries.

A good share of credit for the highly successful meeting goes to Earl Steimle sales manager of the Sodus Fruit Exchange, who was general chairman. Steimle congratulated his hard-working committee chairman whose excellent arrangements made this an unusually good meeting. THE END.

DR. DORSEY RETIRES

Dr. Maxwell J. Dorsey, of Urbana, Ill., known the country over as Mr. Peach, announced his retirement as the secretary-treasurer of National Peach Council at the 1957 convention held in St. Joseph, Mich. Dr. Dorsey plans to devote more time to his writings and hobbies, and spend more time with his family. The convention delegates presented him with an engraved gold wrist-watch and gave a standing ovation in appreciation of his contributions to the peach industry. Dr. Dorsey has steadfastly advocated the marketing of better quality and better matured peaches.



Here are the 1957 officers of National Peach Council. Left to right: Samuel Dillon, Hancock, Md., second vice-president; Robert Rice, Palisade, Colo., first vice-president; Mark Boatwright, Johnston, S.C., president; and Harold J. Hartley, Carbondale, Ill., the new secretary-treasurer.

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Its benefits are many:

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In addition, the Crown Poly Paper Bag is odorless, tasteless and heat sealable. The non-tacky polyethylene coating permits easy filling and pouring. This sturdy new bag comes in a wide range of weights and sizes, in natural, bleached, and special colored kraft and sulphite grades. Crown Poly Paper Bags may be printed in attractive colors, with taste appeal design. For complete information write or phone Crown Zellerbach, 343 Sansome Street, San Francisco 19, California.

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Great Freezes

THE 1955 FREEZE *In The* NORTHWEST

Drastic action by growers after the big freeze has brought the industry through a major crisis

By JOHN C. SNYDER
State College of Washington

THE November freeze of 1955 made some indelible impressions upon the minds of Washington fruit growers. Conditions previous to and following the freeze point out lessons that have been learned.

The 1955 growing season was unusually short. Apples were in bloom approximately two weeks later than usual in most areas of central Washington. Weather conditions into early November, instead of getting the trees ready for winter, kept them growing. In many areas the November freeze was the first freezing temperature of the season. Furthermore, in some areas the period immediately previous to the freeze was warmer than usual, as in the Walla Walla area where the average maximum temperature for the week previous to November 11 was nearly 60° F.

In general, only the frosty locations received the hardening influence of freezing temperatures prior to the big freeze. Most of the leaves were still on the trees, some apples were unpicked and more were on warehouse platforms with inadequate protection. Much nursery stock was still undug. There was little snow on the ground but fortunately, from the standpoint of root protection, the ground had been well soaked by fall rains.

The cold spell lasted about one week. During this period the temperature dropped to almost zero in the Yakima and Wenatchee areas, and to about 15 below zero in the Walla and Spokane areas.

The first examinations of the trees were made in late November—about two weeks after the freeze. By this time the wood and buds were com-

(*Continued on page* 37-B)

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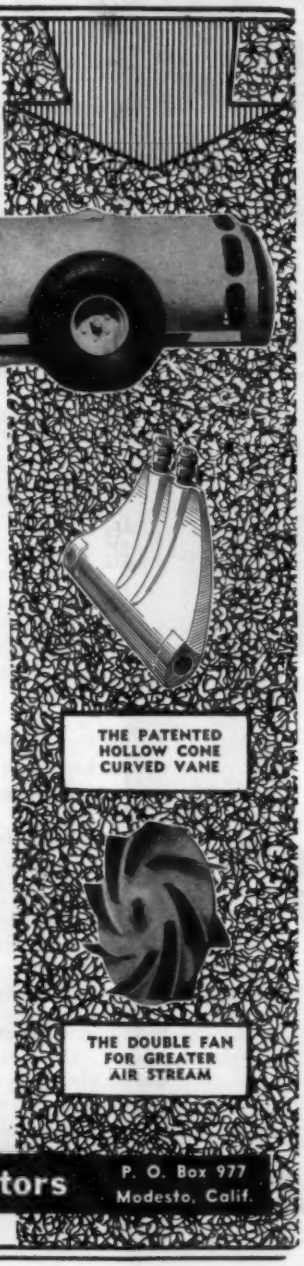

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Art Sunderland, county agent of Dayton, Wash., was surprised to find serious injury to five-year-old Delicious in his area. Most trees in the condition of this one never leafed out, growers learned.

Michigan growers report:

"ORTHOCIDE (captan) IN AN ORTHO PROGRAM MEANS MORE PROFIT"

"We have followed an ORTHOCIDE program for two years and have never been so well satisfied," says Mr. Robert J. Kline, apple grower of Grand Rapids, Mich., pictured with his son Danny and daughter Cheryl. "Results have been superior keeping quality, nearly 100% scab control, superior finish, and best of all, regular bearing," Mr. Kline reports. "The ORTHOCIDE program has meant greater profits to us due to a larger percentage of No. 1 fruit. It's the most economical program we have ever used."

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Only ORTHOCIDE, a superior formulation of captan, made exclusively by its developer, California Spray-Chemical Corp., provides: (1) exceptionally fine particle sizes. (2) better sticking, wetting, and spreading agents. (3) superior carrying agents. (4) compatibility with the full ORTHO line of insect and disease control products.

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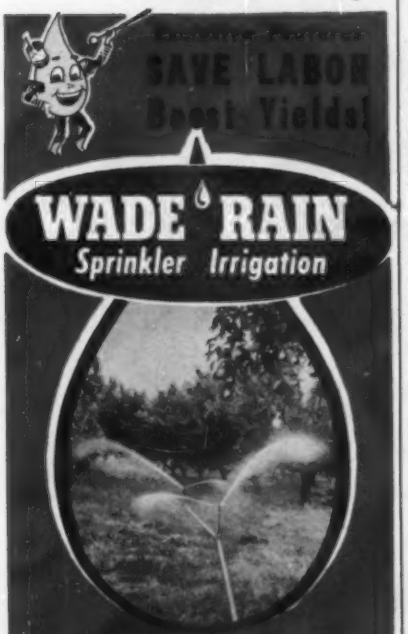

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THINNING SPRAYS

Apple and peach growers tell results of chemical thinning

By ARTHUR E. MITCHELL
Michigan State University

DURING the past 10 years Michigan apple growers have developed naphthaleneacetic acid compounds (NAA) and napthaleneacetamide (ACP Amid-Thin made by American Chemical Paint Co., Ambler, Pa.) into very efficient tools for fruit thinning. NAA is more widely used, but ACP Amid-Thin is gaining an inroad on varieties ripening before McIntosh.

The Barden brothers, Don and Ben, who operate the Barden Orchards near South Haven have been using chemical thinning for several years. Last year they used a sodium salt of NAA, App-L-Set (Dow Chemical Co., Midland, Mich.) at 15 ppm at late calyx on Duchess (Oldenburg), Wagener, Snow (Fameuse), and Grimes Golden with good results.

However, this concentration did not thin Wealthy, Red Astrachan, or Baldwin, and it overthinned Tallman Sweet. When they used 20 ppm of App-L-Set on Wealthy and Baldwin, thinning was very favorable, and this same concentration was a great help in thinning Golden Delicious.

As an experiment, they sprayed three rows of Delicious and three rows of Jonathan using App-L-Set at 10 ppm. This gave good thinning of the Delicious, but overthinning of the Jonathan. ACP Amid-Thin, as they used it, was not as effective as NAA, although it gave fair thinning. The Bardens prefer the NAA, but plan to continue to try ACP Amid-Thin, at least on early varieties, at a higher concentration.

William Smith, of Greenville, likes ACP Amid-Thin better than NAA. His first thinning with NAA dates back to 1941 when he started using this material to thin Wealthy. In 1948 he noticed that the leaves of these trees were dwarfed, and the trees did not have the vigor of former years. He switched to thinning with DN in 1951, and the vigor and appearance of trees improved.

The following year Mr. Smith tried ACP Amid-Thin on the Wealthy trees. The results were not too satisfactory. In 1956 his results were different. He used ACP Amid-Thin at 50 ppm in an interplanted block of Wealthy, Early McIntosh, McIntosh, Delicious, Jonathan, and Northern Spy with very good results. The application was made approximately three days after petal fall on a humid, slow-drying day following a cool, wet period. He has found that under conditions of this nature, more Amid-Thin is taken in by the plant through the leaves, and the chemical does a more effective job of thinning.

Delicious branch (right) sprayed with ACP Amid-Thin at 50 ppm. Check branch at left.

Weather Must Be Right

Under Michigan conditions, growers have found that ACP Amid-Thin at 50 ppm will give good thinning if the weather prior to bloom or just after bloom is wet and humid. When the weather is dry and sunny during and after bloom, ACP Amid-Thin should be used at 60 ppm to obtain good thinning. Thus far in Michigan this material has not caused overthinning at 60 ppm. However, it is suggested that this material be used at petal fall or no later than two or three days after petal fall.

When used later than this, ACP Amid-Thin has failed to thin, but instead has caused the fruit to stick fast to the tree so that no "June drop" occurred. Consequently, at harvesttime there was nothing but a large crop of small, worthless apples.

In contrast to ACP Amid-Thin, Michigan growers have found that NAA should be applied in quick-drying weather, and they are very careful with this material if the weather during and after bloom is wet and humid. In 1956 following weather unfavorable for good pollination and fruit set, growers using NAA as in past years experienced excessive thinning and a partial reduction of crop in some cases. However, the losses were not excessive, and the crop at harvesttime was much more favorable than when observed three to four weeks after the thinning applications were made.

Concentrations of NAA suggested by the state extension personnel

(*Continued on page* 34)

quality goes up— costs come down with . . .

• This McIntosh tree in the Davis Orchard, Bolton, Mass., has been protected from both scab and rust for 15 years with Du Pont "Fermate." Long-term tests prove that "Fermate" performance helps increase yields of fancy apples . . . at lowest cost to you.

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1. **Wide-range protection:** "Fermate" controls both scab and rust, plus more minor diseases than any other fungicide.
2. **Maintain orchard vigor:** "Fermate" helps keep leaves dark green. Good foliage makes big yields.
3. **Low original cost:** The low price of "Fermate" means less money in the tank.
4. **Lower cost per bushel:** More apples with "Fermate" means lower cost of production.
5. **Fine finish of red varieties:** "Fermate" does not contribute to sun scald or russet of red varieties.

FOR PEACH-LEAF CURL . . . Both experiment stations and growers have found "Fermate" a highly effective, yet inexpensive, dormant spray.

. . . and for the most effective answer to other fruit-growing problems, use these dependable Du Pont chemicals

To control both scab and rusts on all apple varieties including Goldens, use Du Pont Thylate® thiram fungicide. Tops for early control, for combining with mercury curatives or sulfur, and for a buffer spray. Its white residue allows fine finish on all varieties.

Don't let sooty blotch or flyspeck take over an otherwise clean crop. Regardless of the early protection used, put Du Pont Parzate® zineb fungicide in late-season sprays and be sure. It's light-colored and leaves no residue.

Kill both curculio and codling moth with Du Pont Marlate® 50 methoxychlor insecticide. The long-lasting residue protects from one spray to the next. Marlate® doesn't contribute to russeting—even on sensitive varieties.

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It's Wise to Make

Weather Reports Work for You!

Does your thermometer disagree with the weatherman's? Here are facts you should know about air temperature

By JAMES M. BEALL
U. S. Weather Bureau

HOW can a fruit grower use the Weather Bureau forecasts to best advantage? Let's take one phase to see what we can do—minimum temperature.

When you hear on the weather report that the low last night was 40°, did your thermometer stand there at day break? Does your thermometer generally differ from the official temperature? Is it generally higher? How much?

Your thermometer should be hung where the air can get around it without obstruction, yet be in the shade. Suspend the thermometer in an apple box or an orange crate and tack the box on a post 15 or 20 feet from buildings. The open side of the box should face north so the daytime sun can't get in.

Here are some of the things that make a difference between your temperature reading and the official one. First, is there a wind? You will find that the more wind, the closer your thermometer will read with the official. If the wind is calm, there may be a bigger difference. The second factor that makes a difference is the amount of clouds. On a cloudy night the earth has a blanket of sorts which keeps the temperature from falling too fast. A third factor that you must consider is the condition of the soil. Is the ground wet or dry or covered with snow? Snow will cool the fastest, dry soil next, and wet soil slowest during the night.

Protect your weather instruments by housing them in a shelter such as this. It is a wooden box with double roof and base and louvered sides to permit air circulation. Instruments are mounted on vertical supports in middle of shelter about 5 feet above ground. Build 15 feet away from buildings with open side to north.

Keep a Weather Chart

Now let's conduct an experiment to find out just how the temperature in your orchard or grove differs from the official temperature recorded at the Weather Office. Below is a simple chart with which you can keep a record for a month or so.

WEATHER CHART

	Cloudy night		Partly cloudy		Clear	
Soil	Dry	Wet	Dry	Wet	Dry	Wet
Calm						
Light wind				−5(b)		
Moderate wind		−4(a) −3 −2 −1 +1 −2 −1 −4 −6 −5 10 −23 −2.3				

We have three choices as to whether the sky was cloudy, partly cloudy, or clear during the night; of whether the soil is wet or dry, and finally a choice of whether the wind during the night was calm, light, or moderate. After you have figured out what kind of a night you had, compare the low temperature on your farm with the one given by the weatherman on the radio.

Some Samples

Let's take a couple of samples. It has been rainy, cloudy, and blowing all night. You read 38° on your thermometer and the weatherman says it was 42°. Enter a −4 in the section for cloudy night, wet soil, moderate wind, (see example (a) of the sample chart). The next night it is partly cloudy, the ground is wet, and the wind is light. The thermometer on your post reads 41° and the official thermometer is 46°; then you would put −5 on the chart as shown in example (b).

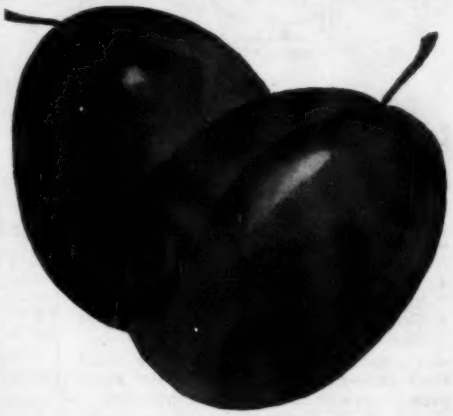
Keep this chart until you get at least 10 values in each box, then average them as we have done in the example. You'll soon be able to make the official temperature apply to your farm. THE END.

Harvest bigger yields, better quality fruit!

STOP

Plum Curculio

WITH dieldrin

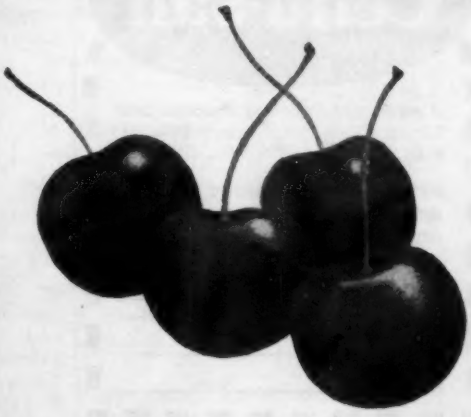


One serious infestation of plum curculio can destroy your fruit profits. That is why more and more growers are safeguarding their crops with powerful dieldrin.

Dieldrin's long-lasting action keeps on controlling plum curculio for many days after application. And it puts an end to these pests if they touch, taste, or breathe it. Dieldrin is the answer to more effective plum curculio control.

Apply dieldrin spray during the pre-bloom or post-bloom periods. For most effective use of dieldrin in your area, check the recommendations of state authorities.

Get bigger yields of better quality fruit this season—control plum curculio and "catfacing" insects with dieldrin. Dieldrin is available under well-known brand names from your insecticide dealer.



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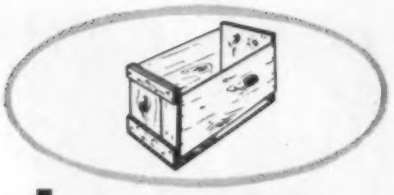

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SUPER SPORTS

Color a problem in your area? Try the early-coloring sports

THE new, early-coloring bud sports of Red Delicious are creating a good deal of interest in both eastern and western apple circles. The new strains are sports of sports, or "super sports." During the past few years more than 20 new, early-coloring bud sport strains of Red Delicious have been discovered and are being developed.

The new sports color up sooner, and most of them seem to be as superior in fruit color formation to the older bud sports, such as Starking, Richared, and Shotwell, as those strains were to regular or common Delicious.

With the new sports, in areas where color is a problem, it will be possible to avoid late picking and thus eliminate problems of overmaturity. However, in areas where color is not a problem, growers will probably get just as good results and perhaps more attractive color from the present red strains.

No Delay of Harvest

The new sports do not mature earlier, but they do color up earlier. All have substantial color by mid-August. The advantages of the new strains are expected to be: 1) earlier over-all color; 2) less need for spot picking; 3) eliminating delay of harvest for color; 4) possibility of heavier nitrogen fertilization and heavier yields with no sacrfice in color.

Disadvantages of the new sports might be: 1) too dark a color at picking; 2) temptation for growers to pick too early and flood the market with immature fruit.

Of the new red sports, there are five now being propagated commercially by nurseries. Supplies for spring planting are sold out, and trees will not be available until this fall or next spring.

Of those which will be available this fall, **Royal Red** is a bud sport of Richared Delicious, and is propagated by the Columbia & Okanogan Nursery Co., Wenatchee, Wash. Royal Red resembles Richared in every respect except in time and intensity of color formation. According to C. & O., it has a solid pattern of color formation, attaining full color even in the most shaded part of the tree, and it colors up about ten days ahead of Richared.

Red King, propagated by the Van Well Nursery, Wenatchee, Wash., is a sport of Starking Delicious. It has a striped pattern of color formation, the stripes being wider than on Starking, more intense, and with a deeper red. The stripes gradually blend together.

Another sport of Starking is **Hi-Early,** propagated by the Heath Nursery, Pateros, Wash. Hi-Early also colors with a stripe which gradually merges into an attractive solid pattern.

A third early-coloring Starking sport is **Hi-Red,** propagated by the Charles Morrison Nursery, Zillah, Wash. Hi-Red produces fruit similar to Starking except for time and intensity of color formation.

Growers interested in detailed descriptions of the new, early-coloring bud sports may write to Edwin Gould, Agricultural Experiment Station, Kearneysville, W. Va., and request a copy of the mimeograph, "New Early Coloring Bud Sports of Red Delicious."

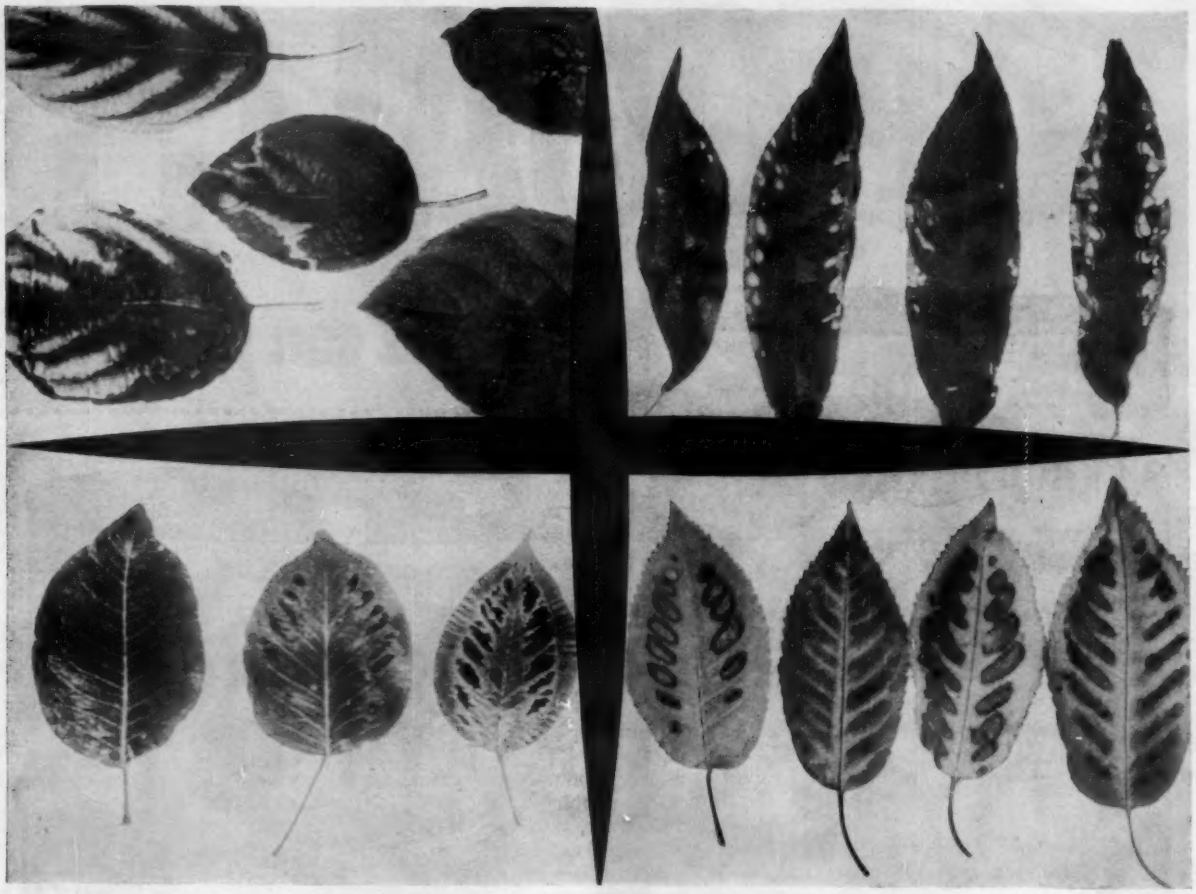
Spur-type Sports

In addition to the above varieties, which are produced on standard trees similar to the parent Starking or Richared trees, sports are available on the spur-type tree. One of these is the **Starkrimson,** propagated by Stark Bros. Nurseries, Louisiana, Mo. In tree characteristic it is similar to the Okanoma Red which was planted some years ago in a few orchards in Washington.

The spur-type tree produces a tree somewhat smaller than standard and earlier in production. It is thought that the spur-type tree will show a higher degree of hardiness both in wood and in blossom. It is also expected that with the spur-type tree, it will be possible to plant more trees to the acre, perhaps on a 20- to 25-foot spacing. A characteristic of this type of tree is the formation of numerous fruit spurs which might possibly decrease pruning costs.

In fruit characteristic, Starkrimson is solid in its pattern of color. As with the other sports, fruit color formation begins much earlier and is more intense than with Starking.

Another spur-type sport expected to be available in a year or two is **Redspur,** which is being propagated by the C. & O. Nursery at Wenatchee, Wash. THE END.



have you seen any of these in your orchards?

Apples | Peaches
Pears | Cherries

Chances are—you have *not*, because the dead spots in these discolored leaves appear only in the later—and very obvious—stages of magnesium deficiencies. When you do see these magnesium deficiency danger signs in the leaves, you'll probably also see other indications of a very serious shortage of magnesium: (1) early defoliation; (2) poor fruit color; (3) lower fruit quality; and (4) winter damage of trees.

Don't wait until early defoliation, inferior fruit and winter kill tell you your trees lack the water-soluble magnesium they need. Then, it's too late. Profit-wise fruit growers prevent magnesium deficiencies *before* they become obvious . . . before the shortage of water-soluble magnesium robs them of maximum yields and top profits . . . by applying recommended amounts of SPM Premium type fertilizer containing Sul-Po-Mag. An investment of just pennies per tree can guarantee that your trees will get *both* fast-acting, readily available, water-soluble magnesium . . . and sulphate of potash. Most fertilizer manufacturers make grades with "SPM." Ask for them at your fertilizer dealer.

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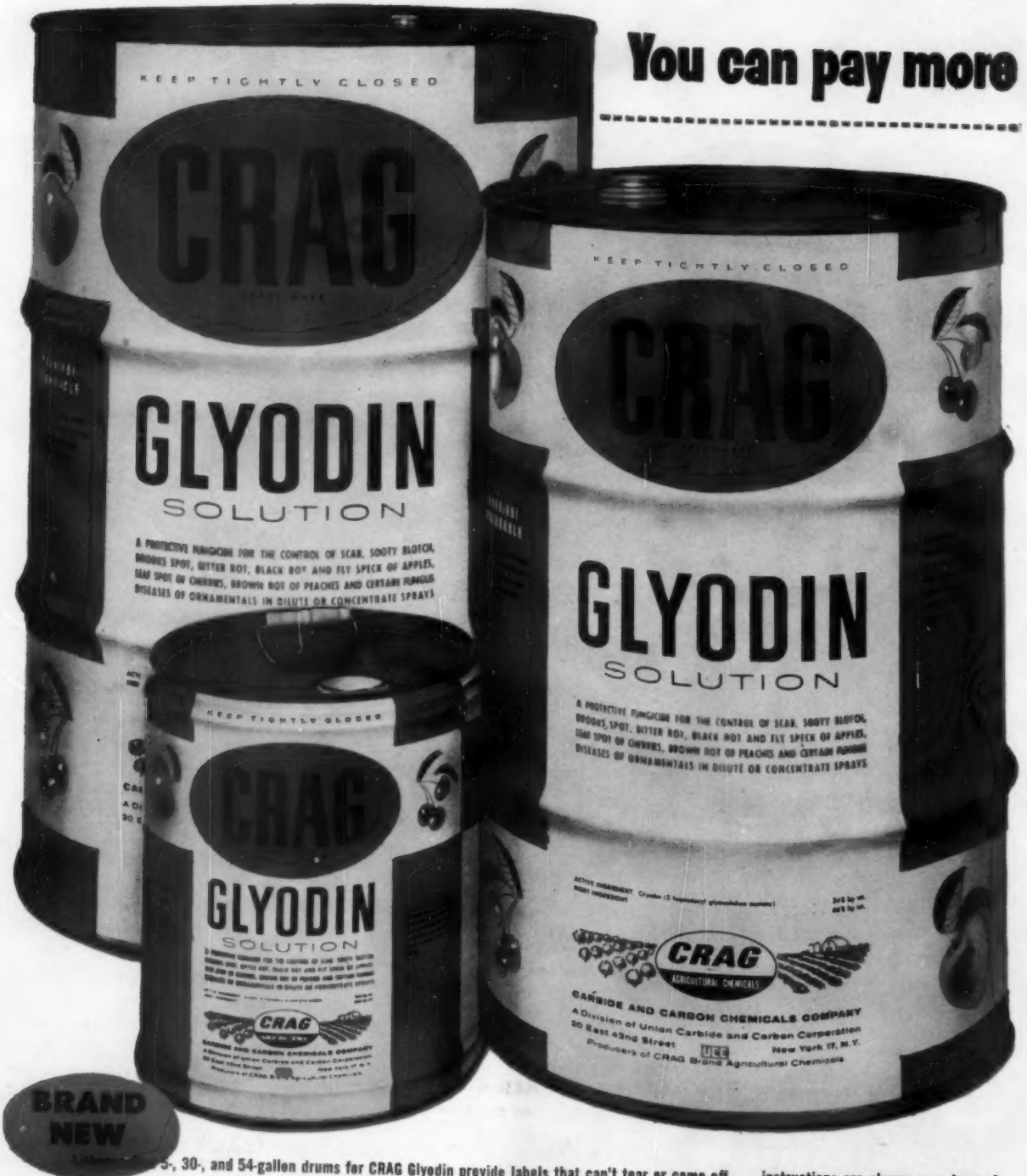

KEEP TIGHTLY CLOSED
CRAG
GLYODIN
SOLUTION
A PROTECTIVE FUNGICIDE FOR THE CONTROL OF SCAB, SOOTY BLOTCH, BROOKS SPOT, BITTER ROT, BLACK ROT AND FLY SPECK OF APPLES, LEAF SPOT OF CHERRIES, BROWN ROT OF PEACHES AND CERTAIN FUNGUS DISEASES OF ORNAMENTALS IN DILUTE OR CONCENTRATE SPRAYS
CRAG
AGRICULTURAL CHEMICALS
CARBIDE AND CARBON CHEMICALS COMPANY
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street
New York 17, N. Y.
Producers of CRAG Brand Agricultural Chemicals
BRAND NEW

5-, 30-, and 54-gallon drums for CRAG Glyodin provide labels that can't tear or come off . . . instructions are always easy to read.

at LOW COST

but you can't buy better control of apple scab!

ALL SEASON PROTECTION

CRAG Glyodin fungicide provides powerful *all season* protection against apple scab when used in early sprays and cover sprays. It also controls summer diseases such as sooty blotch, bitter rot, Brooks spot, fly speck, and black rot. Glyodin is effective against brown rot of peaches interplanted with apples, and cherry leaf spot. For only 75¢ per 100 gallons of early spray and 54¢ per 100 gallons of cover spray, CRAG Glyodin offers unmatched advantages that mean better fruit at lower cost.

HELPS INSECT CONTROL

CRAG Glyodin teams up with insecticides . . . some insecticides tend to be more effective with Glyodin than with other fungicides. This extra Glyodin advantage has been proved in 13 tests in which 21 different insecticides, miticides, or combinations of the two were used with several fungicides. Comparative results were obtained from tests on codling moth, curculio, green apple aphis, mites (European red, two-spotted, and Schoene), red-banded leaf roller, and rosy apple aphis.

CUTS MITE SPRAY COSTS

CRAG Glyodin saves as much as three miticide sprays a year when used in full-season schedules of early sprays and cover sprays. In one season, a grower saved $1,166 in special mite sprays because Glyodin kept mites from building up in his orchard. CRAG Glyodin kills both adult mites and nymphs on contact. And, unlike some apple fungicides, it does not harm beneficial insects that feed on mites. CRAG Glyodin cuts mite spray costs!

THE SCAB SPRAY THAT PAYS MORE WAYS

CRAG Glyodin works equally well in dilute or concentrate sprays to provide outstanding protection that helps assure maximum yields of clean fruit with the color and finish the market prefers.

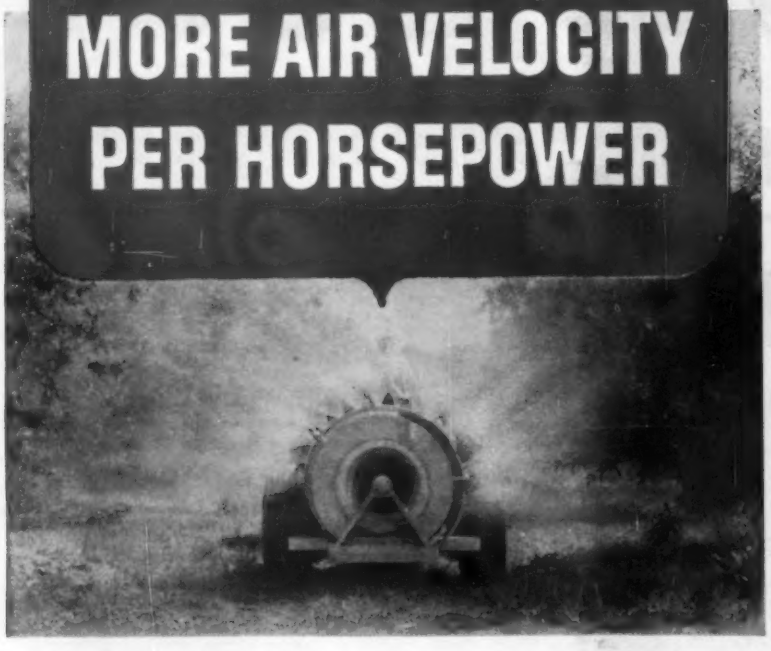
For efficiency and economy, CRAG Glyodin is your best fungicide buy! Plan now to use it all season long. See your supplier . . . or write for full information.

CARBIDE and CARBON CHEMICALS COMPANY
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.

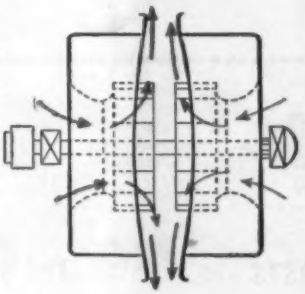
CRAG BRAND AGRICULTURAL CHEMICALS

"CRAG" IS A REGISTERED TRADE-MARK OF UNION CARBIDE AND CARBON CORPORATION

Myers Sprayers Deliver MORE AIR VELOCITY PER HORSEPOWER



Myers Orchard and Grove Air Sprayers feature centrifugal "squirrel cage" blower fans. The drawing shows why they are the most efficient type. See how the direction of the air is changed BEFORE THE AIR STREAM REACHES ITS MAXIMUM VELOCITY. This tremendous volume of air, moving at hurricane speed, is not deflected again until it covers the trees from top branch to trunk with protective spray.



In other types of air sprayers, the air stream is deflected and turned AFTER THE AIR REACHES MAXIMUM VELOCITY. Result: the air stream is robbed of part of its effectiveness as the velocity is decreased during turning.

See how other features of Myers Air Sprayers can help you produce greater high-profit yields. Call your Myers dealer today for details.

Myers® **POWER SPRAYERS**
WATER SYSTEMS AND IRRIGATION PUMPS

THE F. E. MYERS & BRO. CO.
Ashland, Ohio · Kitchener, Ontario

THE QUESTION BOX

Don't be perplexed! Send us your questions—no matter how big or small. A three-cent stamp will bring you an early reply. Address: The Question Box, AMERICAN FRUIT GROWER, Willoughby, Ohio.

FRENCH HYBRID GRAPES

Where can I purchase some French hybrid grape vines as mentioned in Guy Trail's story in the October grape issue?—*Oregon.*

Try the New York State Fruit Testing Cooperative Association, Geneva, N. Y.; C. A. Stoughton, Fredonia, Kans.; or Boordy Vineyard, Box 38, Riderwood, Md.

ORIGIN OF GOLDEN DELICIOUS

What is the origin of the Golden Delicious apple, the world-known beauty of American and European orchards? Is it a chance seedling or the result of a cross between two good varieties?—*Switzerland.*

The Golden Delicious originated as a chance seedling in the orchard of A. H. Mullins in West Virginia about 1908. It was introduced by Stark Bro's Nurseries, Louisiana, Mo., in 1916.

FRUIT VENDING MACHINE

What is the name of the company that sells the fruit vending machine pictured in your November issue? I'm interested in purchasing one.—*Michigan.*

Fruit-o-matic Mfg. Co., 5225 Wilshire Blvd., Los Angeles 36, Calif.

PECAN CULTURE

Can you tell me what type of soil and what elements pecan trees require? My papershells are not growing as fast as it seems they should. —*Oklahoma*

It is not unusual for pecan trees to start off slowly. Usually, however, after the second or third year they make a rather rapid growth until they reach eight to 10 years of age, when the rate of growth may again decline.

Pecans do best in a soil containing relatively high organic matter and moisture, reports Dr. Frank Cross at Oklahoma A. & M. College. The application of some sort of nitrogenous fertilizer is very helpful in promoting faster growth when it is desirable. In Oklahoma, the growth is regulated so that the tree will make from 4 to 8 inches of terminal growth each year. If the trees are not making that much terminal growth, apply ammonium nitrate or some other carrier of nitrogen by spreading it by hand over the surface of the soil, outward from the trunk of the tree for as far as the branches extend.

TENNESSEE PEACH RED LEAF ROOTSTOCK

Can you tell me the name of a nursery that has for sale peach trees on Tennessee red leaf rootstock? Is this stock resistant to nematodes? —*Texas.*

Try Stark Bro's Nurseries, Louisiana, Mo., or McClain Kent, Garden Center and Nursery, Chapman Highway, Knoxville, Tenn. As far as we know, no claim is made for nematode resistance in this rootstock.

WEED KILLERS

I saw in *American Fruit Grower* that CMU will control weeds in grape vines and CIPC or dalapon in red raspberries but our dealers don't carry these products. Could you tell me who manufactures them?—*Pennsylvania.*

CMU is manufactured by E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.; CIPC by Columbia-Southern Chemical Co., One Gateway Center, Pittsburgh, Pa.; and dalapon by Dow Chemical Co., Midland, Mich.

EAST and WEST, GROWERS AGREE . . .

"Best answer yet for early mites!"

Growers all over the country are saying:

". . . One Genite EM-923 spray applied during the pink spray held European red mite population under control throughout the season."
Kent City, Michigan, grower

"After 11 years of fruit growing, I have found the answer to the red mite problem. Genite EM-923! It is the best mite spray I have ever used."
Orefield, Pennsylvania, grower

"Application in prebloom of Genite EM-923 in combination with lime sulfur effectively controlled European red mite for remainder of season."
Orondo, Washington, grower

"We have tried Genite EM-923 2 years in a row and in each case we had excellent control, lasting well into August. We intend to use Genite this year on all our orchards."
Coloma, Michigan, grower

"Several of our growers used Genite EM-923 for the first time in the spring of 1956. In every case it was unnecessary to spray for red mite through remainder of season."
Wenatchee, Washington, horticulturist for shipping warehouse

"I used one application of Genite EM-923 on all apples prior to bloom. Used no other miticide all season . . . had excellent control of red mites at harvest . . . I feel that Genite is the best and cheapest material I can use for mite control."
Hartford, Michigan, grower

ORCHARD® BRAND

GENITE® EM-923

AMAZING "ONE-SHOT" MITICIDE

Prove for yourself how Genite EM-923 early mite spray controls European red mites till far into summer on apples, peaches, pears, plums and prunes. Fewer sprays needed. Reduces residue problems. Use Genite this season on part of your orchards or on all. See your Orchard Brand dealer now to be sure of getting the supply you need.

ORCHARD BRAND SPRAY MATERIALS

A Better America through Chemistry
CHEMICAL PROGRESS WEEK April 8-12

GC Allied Chemical

GENERAL CHEMICAL DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.

Curculio and Codling Moth

kill BOTH apple pests with ONE insecticide

Du Pont Marlate® 50

Methoxychlor Insecticide

Apples get double protection from one insecticide when you spray "Marlate" 50. It stops curculio damage—early or late. And, when cool weather delays emergence, "Marlate" 50 controls late curculio as well as codling moth that may be active at the same time. The long-lasting residue from "Marlate" holds against curculio and codling moth from one spray to the next.

Finer finish and more effective protection close to harvest are other extras you get with "Marlate." Du Pont "Marlate" doesn't contribute to russeting—even on sensitive varieties. Use it to stop apple maggot, right up to 7 days before picking.

CHERRY GROWERS

"Marlate" 50 gives you top control of curculio and cherry fruit fly plus mild action on fruit and foliage. Put a block on a "Marlate" 50 program and see for yourself. On Montmorency, "Marlate" 50 helps increase yield by assuring better vegetative growth. Use it on English morello to avoid dry stem.

GRAPE GROWERS

Spray with Du Pont "Marlate" 50 methoxychlor insecticide for effective control of grape berry moth . . . right up to seven days before harvest without residues being a hazard to consumers. Experiment stations now recommend "Marlate" 50 for particular use in late season sprays. Du Pont "Marlate" 50 is also the dependable insecticide to use for control of Japanese beetle and grape leaf skeletonizer.

On all chemicals always follow label instructions and warnings carefully.

DU PONT
REG. U.S. PAT. OFF.

MARLATE® 50
Methoxychlor Insecticide

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

Dr. Krick and his electronic forecaster.

ELECTRONIC FORECASTER

The famous electronic computer, UNIVAC, now forecasts weather

TELEVISION viewers who watched Remington Rand's electronic computer UNIVAC, perform on Election Night will not be surprised to hear that it is proving as dependable at predicting weather as it is in predicting election results.

Dr. Irving P. Krick, weather expert at Denver, Colo., is engrossed in work that will make it possible for his firm to develop highly dependable forecasts on a day-to-day basis one to five years into the future!

Back in the 1930's, Dr. Krick and his associates at California Institute of Technology reasoned that the atmosphere must be orderly in its behavior. If one could take a segment of data, perhaps 20 years or more, of daily pressure patterns—it would be possible to analyze these data and use them to predict the weather.

The theory was sound, but it would have taken a crew of 60,000 to 100,000 men working continuously to attain the mathematical precision necessary to project weather events forward by this complex method.

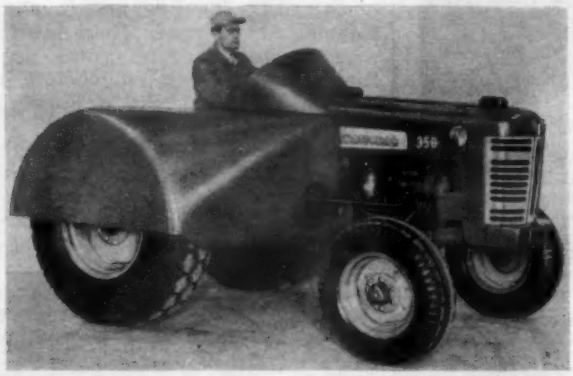
Clear Weather for Ike

The soundness of Dr. Krick's techniques with UNIVAC was demonstrated during its first real test. On January 4, 1957, Dr. Krick's firm was appointed the official forecasting agency for the 1957 presidential inauguration. On January 11 they officially predicted that on Inauguration Day, January 21, in Washington, D.C., the weather would be clear in an otherwise stormy three-day period.

This forecast turned out to be exactly right! THE END.

TRACTION for the
HEAVY PULLS!
Just pull the Torque Amplifier lever
to reduce speed and increase pull-power
up to 45 per cent, on-the-go, in any gear.
Push lever, full speed again!

1957 International® 350 Utility tractor



New shielding attachment quickly adapts the new International 350 Utility tractor for work in orchard, vineyard, and grove. Does not interfere with use of Traction-Control Fast-Hitch implements for work in open fields.

Head right up a steep, soft slope! Feel the new International 350 Utility *hang on*, the wheels *hold*, pulling a heavy sprayer. See how up to 1,000 pounds greater built-in weight than other utility tractors gives you ground-hugging traction . . . turns stepped-up engine power into *more pull-power!*

Slow to a crawl for thorough spraying, with either engine or pto-drive sprayer. Pull the Torque Amplifier lever, *on-the-go*, cut speed one-third . . . to as low as 1.8 mph. Push the lever, resume full gear-speed as high as 16.75 mph for fast transport—no shifts, no stops, no spray-pressure drops! *All this, and power steering, too!*

Call your IH dealer. He'll gladly demonstrate! Make your *own* free traction test with the new International 350 Utility! See how it will pay for itself in use, on the IH Income Purchase Plan. *Phone today!*

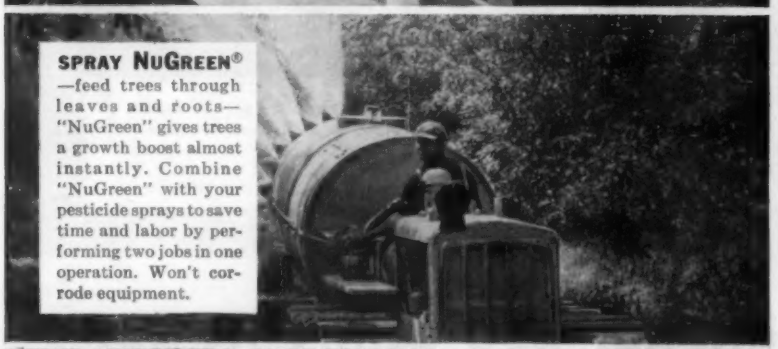
SEE YOUR
INTERNATIONAL HARVESTER
DEALER

International Harvester products pay for themselves in use — McCormick Farm Equipment, Farmall and International Tractors . . . Motor Trucks . . . Construction Equipment—General Office, Chicago 1, Illinois.

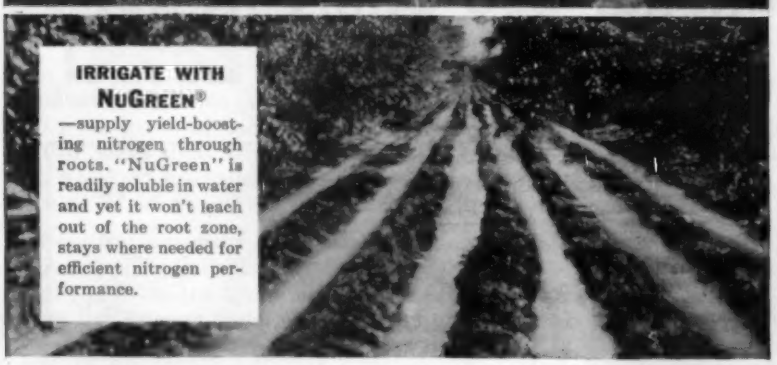
To grow better fruit apply high-quality DU PONT NuGREEN®

FERTILIZER COMPOUND

SPREAD NuGREEN® —feed nitrogen at the rate needed for steady, season-long growth and top yields of high-quality fruit. It's concentrated, 45% nitrogen . . . resists leaching and is readily available. And "NuGreen" aids decay of plant residues and cover crops.



SPRAY NuGREEN® —feed trees through leaves and roots—"NuGreen" gives trees a growth boost almost instantly. Combine "NuGreen" with your pesticide sprays to save time and labor by performing two jobs in one operation. Won't corrode equipment.



IRRIGATE WITH NuGREEN® —supply yield-boosting nitrogen through roots. "NuGreen" is readily soluble in water and yet it won't leach out of the root zone, stays where needed for efficient nitrogen performance.

You gain with Du Pont "NuGreen" because it feeds nitrogen for higher yields of better fruit and can be applied efficiently by whatever method best suits your operations. You save time and labor with "NuGreen" because you handle less material per unit of nitrogen applied. "NuGreen" comes in 80-lb. bags—in free-flowing shot form. Order your supply of Du Pont "NuGreen" soon . . . it's your best buy in supplemental nitrogen.

E. I. du Pont de Nemours & Co. (Inc.), Polychemicals Department, Wilmington 98, Del.

DU PONT
REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

NuGREEN®
FERTILIZER COMPOUND
—it's concentrated 45% nitrogen

THINNING SPRAYS

(*Continued from page* 22)

were followed closely when these thinning programs were first started, and careful records were made of weather conditions before and at the time of the thinning applications.

Peach Thinning

To date, no good chemical method has been devised for thinning peaches.

The Barden brothers used DN-289 in 1956 and were very satisfied with results. They used 1 pint per 100 gallons on Redhaven, Halehaven, Early Halehaven and Kalhaven, and ½ pint per 100 gallons on Elberta. They concentrated on the tops of the trees which are hard to thin by hand. They send thinning crews in later to break the clusters and to thin the portions of the trees not thinned by the chemical. They have found this method of thinning a very profitable procedure. They try to time their thinning application when the stigma of the pistil has pushed out of the enclosure of the petals, just before the blossoms fully open.

Some Michigan growers tried ACP Peach-Thin 322 (American Chemical Paint Co., Ambler, Pa.) for the first time in 1956 with varying results. Wallace Heuser, of Hill Top Orchards at Hartford, feels the material has promise and plans to try it again in 1957. In experimental plots the material applied three to four days after full bloom overthinned Redhaven and Halehaven when used at 300 ppm and gave no thinning at 200 ppm. There is still much to learn regarding the performance of this material before it can be suggested for widespread commercial use.

Studies in 1956 in Michigan with 3-chloro IPC on Redhaven and Halehaven for peach thinning resulted in off-shaped peaches at harvest. Thus, this material is not suggested for use in 1957.

Chemical thinning of apples is an established practice in Michigan, but the present picture for chemical thinning of peaches is still not clear. ACP Peach-Thin 322 is suggested for trial in Michigan in 1957, using 200 ppm on Elberta and 250 to 300 ppm on Redhaven and Halehaven, and applying the material within one to five days after full bloom.

Michigan growers will continue to use DN compounds for peach thinning in early bloom, but each grower has to rely on his own experiences, as the material has not given consistent thinning in experimental studies in Michigan. THE END.

How DODGE *PowerGiants* help keep the cost of farming down!

Look at it this way: the more power you have in a truck, the quicker and easier it is to get your farm hauling jobs done. And a Dodge *Power Giant* gives you the most powerful V-8 of the low-priced three.

This extra power helps cut corners on costs, too, because it means less strain on the engine. Less strain means less wear and fewer repair bills. What's more, Dodge *Power Giants*, both 6's and V-8's, deliver full power on *regular* gas.

Dodge saves you time, as well as money, because it's built to haul heavier loads. In fact, the Dodge 300 pick-up can haul up to 73% more than other low-priced pick-ups. Why not see your Dodge dealer and drive a new Dodge *Power Giant* yourself? Try the extra convenience of a push-button automatic transmission*. . . there's nothing like it.

**Available on all low-tonnage and Forward-Control models.*

DODGE TRUCKS

Most Power of the low-priced 3

Collect Your Extra Dividends!

***APRIL* IS DODGE**

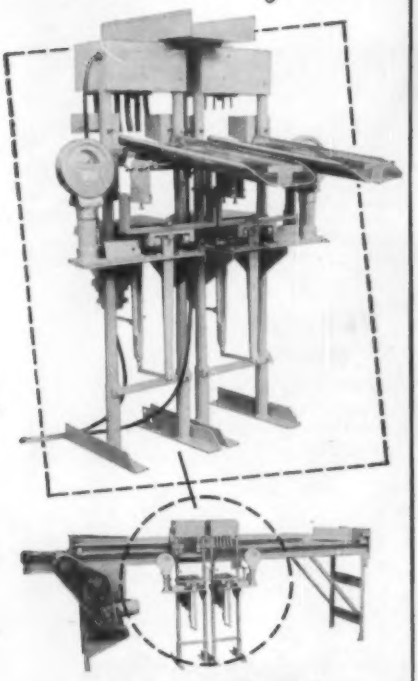
Extra-Dividend Month

Get *extra dividends* in power, *extra dividends* in payload, *extra dividends* in performance . . . plus a special *extra-dividend* deal on a new Dodge *Power Giant*.

SEE YOUR DODGE TRUCK DEALER NOW!

NOW PREPACKAGE APPLES

Automatically!



with *fmc check-way* bagging heads and Return Flow conveyor tables

This combination of FMC filling stands with specially designed apple bagging heads, and the FMC return flow conveyor table guarantees you gentle, efficient prepackaging of apples with no bruising or stem puncture. The reverse belt table provides a gentle constant flow of fruit to the bagging heads. Weight is continuously accurate. Machine operation is micro-switch controlled—apples are gently rolled into mesh, or pliofilm bags. Operator simply tips the hopper, removes the filled bag and replaces with an empty bag—easily handles two hoppers for maximum output. FMC return flow conveyor tables are fabricated to fit your packing house requirements with as many dual-bagging heads as needed. Special citrus as well as universal heads (for package produce) available. Don't delay—put this automatic profit making combination to work for you. Send today for complete details.

FMC Filling stands and hoppers mount on the FMC return flow conveyor table or your existing distribution belt system.

FOOD MACHINERY
AND CHEMICAL CORPORATION
FLORIDA DIVISION
LAKELAND, FLORIDA

8-4

This is what was left of a 120-acre apple orchard in southwestern Iowa in the summer of 1941. The orchard was completely terraced and replanted, using only hardy understocks.

Why Iowa Growers *Swear by* HARDY UNDERSTOCKS

Great Freezes

The Armistice Day freeze of 1940 taught growers a hard—but valuable—lesson

By H. L. LANTZ
Iowa State College

OUT-OF-SEASON freezes have been notorious with respect to injury done to tree fruits. A major disaster occurred to the fruit industry of Iowa, Nebraska, Kansas, and Missouri during the week of November 11, 1940, and is generally referred to as the Armistice Day freeze of 1940.

Below-Zero Temperatures

The warm fall rains prior to the storm provided the conditions that kept apple trees in an active growing condition. A moderate freeze of 24° F. occurred November 7. On November 11 the storm moved in. The temperature at Ames, Iowa, in the forenoon was 51° F., by noon a 50-mile gale prevailed, and by evening the temperature had dropped to 9° F. On the four succeeding days the temperatures ranged from 4° F. to −2° F. In the fruit counties of southwestern Iowa temperatures as low as −15° F. were recorded.

Severe freeze damage to apple, cherry, pear, and some varieties of plum trees was extensive throughout the western half of Iowa, eastern Nebraska and Kansas, and northwestern Missouri. Some thousands of acres of apples were either killed outright or were severely damaged in this Missouri Valley region.

There were two orchards in central Iowa which told a remarkable story. Both had been developed by top-working the desired varieties on hardy stock. In 1924 the late Prof. T. J. Maney planted a stocks test orchard of 760 trees at Ames. There were 10 rows on Virginia Crab and 9 rows on Hibernal. The varieties consisted of Willowtwig, Delicious, Grimes, Jonathan, Edgewood, Sharon, Hawkeye Greening, and Norwel. Each row was 40 trees in length, an even acre. Each variety appeared on both understocks. The odd row on Virginia Crab was Joan.

This orchard lived, practically intact, and produced its best crop in 1946, when a thousand bushels of good fruit were harvested from 40 trees (one acre) of Jonathan and Hawkeye Greening. Delicious on Hibernal did nearly as well. The only variety which produced any bloom in 1941 was Hawkeye Greening.

The other orchard which survived the 1940 freeze was the Apple Grove Orchards at Mitchellville, located about 35 miles southeast of Ames. This orchard consisted of 90 acres, and most trees were of bearing age. Nearly all of the trees in this orchard were on Hibernal stock. This orchard too has produced some of its best crops since the big freeze, and is still doing business.

An examination of Hibernal and Virginia Crab stocks in the experimental orchards at Ames showed

(*Continued on page* 39)

BIG FREEZE Every Ten Years

California growers figure on a major freeze about once a decade

IT is probably safe to say that a winter never passes without the occurrence of frost somewhere in the citrus-growing sections of southern California.

During most winters the temperature does not fall low enough to damage citrus fruits. In other winters the damage is slight and is confined to small areas in the colder localities. But every 10 years or so a general heavy freeze occurs which causes damage to fruit and trees to the extent of many millions of dollars.

Major freezes have occurred in 1913, 1922, 1937, and 1949—and each of these occurred during the month of January. These freezes have been more in the nature of a cold wave than a frost; in fact, the freeze is a combination of cold wave and frost.

These general, heavy freezes have taught growers the value of frost protection, although some orchardists who suffer damage only at 10-year intervals do not provide protection, believing that the investment is not justified.

In 1913 not many citrus groves had orchard protection. By 1922 more orchards were protected with heaters. In 1937 the early and continuous firing of heaters was credited with saving a major portion of the crop, and by 1949 most orchards subject to past injury were protected.

Townspeople Object

During the last 10 years there has been strong agitation in towns and cities against the use of heaters because of the nuisance and damage resulting from the smoke. Ordinances have been passed restricting the type of heater to those that give off a minimum of smoke. The most popular heater now in use is the University return stack type developed by the department of agricultural engineering at the University of California.

The increased cost of fuel oil in recent years has greatly increased the cost of heating. The use of wind machines for orchard protection has grown rapidly, and they are now numbered in the hundreds. These machines are effective most nights, and when used in conjunction with 15 or 18 heaters per acre (50 heaters are needed when used alone) are probably able to cope with most freezes. THE END.

FERTILIZER TIPS from 'EARNIE'
THE COMINCO ELEPHANT
OTHER PEOPLE MAKE MONEY OUT OF FRUIT... WHAT DO THEY DO THAT I DON'T?
USE ELEPHANT BRAND FERTILIZER!
COMINCO
TO PRODUCE A CROP THAT PAYS OFF YOUR TREES NEED LOTS OF PLANT FOOD...
AND ELEPHANT BRAND SUPPLIES IT, IN A READILY AVAILABLE, WATER-SOLUBLE FORM!
ELEPHANT BRAND FERTILIZER WILL BRING YOU MORE, BETTER GRADE FRUIT... AND MORE MONEY WHEN YOU SELL IT!
WS-F-4
GET MORE FROM YOUR LAND... WITH
ELEPHANT BRAND
HIGH ANALYSIS
FERTILIZERS
AMMONIUM PHOSPHATE 11-48-0
AMMONIUM PHOSPHATE-SULPHATE 16-20-0
AMMONIUM NITRATE-PHOSPHATE 27-14-0
NITRAPRILLS (AMMONIUM NITRATE) 33.5-0-0
AMMONIUM SULPHATE 21-0-0
Ask your dealer for ELEPHANT BRAND
Exclusive sales agent for Elephant Brand fertilizers: Balfour, Guthrie & Co. Ltd.
San Francisco · Los Angeles · Seattle · Portland · Spokane · Minneapolis.

NORTHWEST FREEZE

(*Continued from page* 21-B)

pletely thawed and the ground was covered with snow in some areas. Attention was given almost entirely to buds and twigs, and only occasionally did anyone look at the crotches or the trunks of the trees.

There was little damage to pear buds, but cherry buds in nearly all cherry growing areas were severely damaged. In some cases entire spurs were killed. Injury seemed to be greater to leaf buds than fruit buds. This was true of peaches and apricots, as well as cherries.

Tree Trunk Injury

In midwinter, attention in apple orchards shifted from buds and twigs to tree trunks. The discovery of a few badly damaged trunks of young trees soon made everyone realize that in most cases it was the trunks and not the buds that were hurt most.

It was found that injury was restricted to trees ranging in age from one to 15 years. Only in hard-hit areas such as Walla Walla, Spokane, Leavenworth, and Peshastin, were trunks of old trees badly damaged.

In general, one-year-old apple trees came through with very little loss. Injury to trees ranging from two to four years was much greater. In some orchards solid blocks of trees in this age bracket were completely girdled; in other orchards only occasional trees were so affected. Damage to these young trees ranged from complete girdling to a small spot on one side of the tree. For the most part, the injury was confined to the trunks and crotches; buds and branches seemed fairly normal.

Trees between the ages of five and 15 years seemed to be hurt less than those between two and four years. Some trees were injured on the southwest side only; a few were injured on the north side only; many were completely girdled. Injury was greatest on the trunk, but it extended up into and even beyond the framework crotches in many cases. Narrow angled crotches showed the most injury. The buds and young wood, except in the badly hit areas, seemed to be fairly normal. In the most unfortunate areas, many spurs were very brown and some twigs were slightly discolored.

Cecil C. Clark, Wapato, Wash., examines a two-year-old badly damaged Rome. Clark grafted a good many four-year-old Delicious and Golden Delicious trees in his orchard.

A. L. Strauss, Yakima, finds Delicious buds badly discolored. The ends of some spurs died but many badly discolored buds produced fruit, even in 1956.

Apple growers in early spring of 1956 were faced with the problem of deciding what to do with the injured trees. There were several possibilities; each had drawbacks.

In the final analysis, practically no trees were pushed out in the spring of 1956; quite a few were cut off and grafted; a few were side grafted; and a small number were bridge grafted.

The results of the grafting program were extremely variable. Some orchardists were successful with more than 95% of their trees; others failed on almost 95% of theirs. Three factors contributed to the failures: 1) damaged scion wood; 2) hot weather during the grafting period; 3) lack of a sharp line separating the damaged wood from the healthy wood on trunks that were grafted.

Most of the grafting was done on stumps. Grafts that grew made excellent growth and hardened well in the fall of 1956.

Because of the poor condition of the scion wood and the nature of the trunk injury very little bridge grafting was done in the spring of 1956 and the results were not good. Some of the better trees will be bridge grafted again in the spring of 1957.

All in all, the industry is recovering much more rapidly than at first anticipated. The most important reasons for this quick recovery are that everything possible was done by growers to help the trees recover. Secondly, weather conditions during 1956 were ideal for hardening the grafts. THE END.

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FIGHTING FROST

(*Continued from page* 12)

and increase up to and above the tree-top level. Wind machines, which mix this warmer air with the colder air in the orchard and thus raise orchard temperatures, have come into general use in southern California citrus areas in recent years.

The amount that these wind machines will raise the temperature depends upon the amount of warm air above the tree-top level, and this varies considerably. Temperatures are

The use of wind machines in California citrus groves has increased rapidly in the last 10 years.

much higher above the trees on radiational frost nights following cool days, and about as cold as the air in the orchard during spring freezes.

Thus, since the wind machine cannot be depended on to maintain safe temperatures during freezes or exceptionally cold weather, they must be supplemented with heaters.

Since southern California citrus growers must fire about 25 nights per season on the average, the use of a wind machine on mild nights can cut down on the hours of heating, which leads to a considerable reduction in heating costs.

In deciduous orchards, the much smaller number of heating hours makes the potential reduction in heating hours very small. In addition, it is known that much less favorable conditions exist for wind machine operations in the deciduous areas of the Far West than in the citrus areas (there is much less warm air above the treetop levels) and results with wind machines in these areas have been much less favorable than they have been in citrus.

Because of the much smaller potential saving in heating hours

(*Continued on page* 38)

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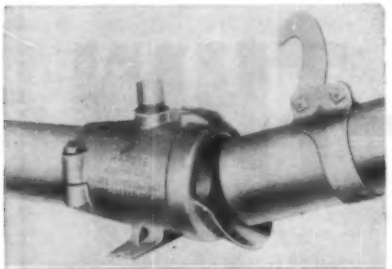

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FIGHTING FROST

(*Continued from page* 37)

and the much less favorable inversion conditions, field men are reluctant to recommend wind machines for protection of deciduous orchards.

Heating With Water

Utilization of the latent heat of water as a means of raising orchard temperatures would appear to be a good and cheap way to protect crops, and spraying of certain types of field crops has been successfully practiced in the past.

However, spraying of deciduous trees with water has not proved successful, since the freezing process must be continued through the entire night if protection is to be assured, and nobody has been able to figure out a way to keep a spray of water in sufficient volume on deciduous trees without breaking them down with the weight of ice.

Running irrigation water through a few orchard furrows affords very little protection. Flooding offers somewhat more protection, but is quite impractical in deciduous orchards.

Radiant Heat

The use of radiant heat has been suggested as a means of protection, and infra red lamps, special oil or kerosene-burning radiant heaters and other infra red devices have been given many field trials. While the theory behind these devices is sound, the practical difficulties attending their use is considerable. Practically all installations in both citrus and deciduous orchards have failed because the amount of radiant heat needed has been grossly underestimated.

Does Heating Pay?

No general recommendations about the feasibility of orchard heating in any orchard can be given. The weather conditions which accompany severe frosts will vary in different parts of the country, and the frost hazard will vary from orchard to orchard. In addition, the variety to be protected, the price received for the crop, the vigor and productivity of the orchard and even its size are factors that must be considered .

Only the grower himself can decide whether or not heating will pay off in his orchard. If he decides to heat his orchard, he should realize at the outset that orchard heating involves as much skill, care, and special knowledge as any other agricultural operation, and that the penalties for mistakes and carelessness are much higher. THE END.

FREEZES

(*Continued from page* 11)

fruit trees. This may be induced by intensive cultivation, over-fertilization, or planting in low areas. In wet, cool seasons every step possible should be taken (beginning in June if danger appears likely) to stop growth and hasten maturity.

"I like to grow peaches for profit and not the orchard for looks." This statement has often been made by Grant Fox, of Ontario, Canada, one of America's top peach growers. It might well be taken to heart by many a young fruit grower who has not been through seasons like 1936 and 1950.

Sunscald injury, occurring most often at the two o'clock (southwest) section of the tree, often as a reflection off the snow, causes much injury in opening up areas for the invasion of wood-rotting fungi. Many growers shade this section of the tree with a board. Equally effective has been the painting of this area with a mixture of skim milk and lime.

While it is not possible to avoid all injury to trees and buds during certain years and in certain combinations of weather conditions, there is much the fruit grower can do. However, the memory of man is short. As the memory of destructive winters or early and late freezes recedes, there is always negligence in applying corrective measures to meet possible future disaster.

Is Our Weather Changing?

Many persons tell me the weather has changed in the past 50 or 100 years. However, they never agree which way it has changed. About as many think our winters are less severe as think they are more severe. There is rather ample evidence that our weather is relatively constant. That there is a wide variation, within certain periods, of prolonged, severe cold, early freezes, late frosts, and wet and dry seasons is abundantly proven within the record of peach production in the past 100 years.

Black Friday, February 7, 1807, when the cold was so sudden and so severe even the forest trees split open, with resounding noise, will return again—but *when?* THE END.

HARDY UNDERSTOCKS

(*Continued from page 36*)

that all of the Hibernal trunks, regardless of the variety worked on it, were sound. No bark damage was recorded, but on the scaffold branches bark killing was rather serious and it required considerable pruning out of severely injured branches on the Delicious and Grimes. The other varieties showed remarkably good condition and resumed bearing in 1942.

There was considerable bark killing on the Virginia Crab trunks, varying from slight damage to as much as 50% of the bark killed, but even here the trees resumed normal growth and production from 1942 until this experimental orchard was removed in 1949.

Hibernal appears to be compatible with all varieties. On Virginia Crab, varieties such as Delicious, Golden Delicious, Winesap, York, Rome, and others have shown marked incompatibility. In Delicious and Golden Delicious this is expressed in a lack of uniformity in tree vigor, and in other cases there is marked dwarfness in structure. This is especially marked in Winesap, Rome, York, Wealthy, and others.

Hardy Varieties

In addition to the above-mentioned experimental stocks orchard, a block of 10 acres was planted to Virginia Crab in 1925 and budded to 200 selected varieties and second test seedlings in 1926. A careful check of the trees in 1941 showed the following results.

	Extent of Injury	No. of Varieties	No. of Seedlings
Class 1	No injury	7	12
Class 2	90% recovery	13	11
Class 3	70-90% recovery	23	25
Class 4	50-70% recovery	20	13
Class 5	25-50% recovery	18	2
Class 6	0-25% recovery	26	2

It was noted that our best commercial varieties such as Jonathan, Delicious, Golden Delicious, Starking, Richard, Red Gravenstein, and many other old-time and once-popular varieties were in classes 4, 5, and 6. Trees of these varieties growing on their own stems were completely killed.

Many individuals and delegations came to study the hardy stocks orchards at Ames, and many new orchards were planted to hardy stocks during the 40's and top-worked to commercial varieties. These hardy stocks orchards have paid off, and growers are able to rest easy as a result of having their orchards developed on freeze-proof understocks. THE END.

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You can do all this with one sprayer—the 2-fan Hardie Duo-Fan Model 24B, designed, built and priced to give the grower both air stream and high pressure spraying in one compact, streamlined, Hardie quality unit. It's two sprayers for the price of one. Write for literature. Ask your dealer.

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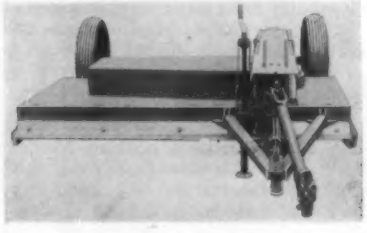

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Great Freezes

Why the World's Leading CITRUS Area Is Located on the 'Ridge'

By JOHN W. SITES
University of Florida

ALTHOUGH Florida enjoys the distinction of being the most southerly located state in the Union, frosts and freezes have played a major role in its agricultural development.

The major early citrus developments of Florida were located mostly in the northeastern part of the state. The first severe freeze which seriously affected this early citrus development occurred in February, 1835. Early records indicate that fruits of all kinds were killed.

Following this freeze, citrus plantings were developed along the Atlantic and Gulf coasts and other waterways where the fruit could be more easily transported to northern and eastern markets, and by 1894 the estimated crop was 6 million boxes.

The "great freeze" came that winter. It started with a freeze in December, 1894, which caused defoliation of the trees. This was followed by a period of unseasonably warm weather. These contrasting weather conditions, plus the defoliation, resulted in an early resumption of growth.

Thus, with trees in this condition, the freeze of February 7-10, 1895, killed most of Florida's citrus except in very well protected areas.

Following a brief respite, the state was hit again February 13, 1899, with the most severe freeze recorded in Florida's history. Temperatures as low as 10° F. were observed by the Weather Bureau at Jacksonville and an all-time low of —2° was recorded at Tallahassee. This was the crowning blow to citrus growing in northeastern Florida, and it has never again succeeded in becoming an important citrus producing area.

Citrus Area Relocated

In geological formation, Florida is comparatively flat, its most imposing peaks rising not much in excess of 300 feet above sea level. The sandy "ridge section" which extends through the central portion of peninsular Florida, however, offers sufficient changes in elevation to allow cold air to drain off, and this, in combination with the tempering effect of Florida's many lakes, gives considerable frost protection to many sites.

With the introduction of rough-lemon stock and the discovery of its adaptability to these sandy soils, citrus plantings developed rapidly in the ridge section. By 1920 citrus production was up to 15 million boxes, but serious problems still beset the industry.

With the economy emphasis, which developed following Florida's land boom and the depression, citrus fertilization changed from the expensive highly organic mixtures to the cheaper inorganic mixtures.

Soil Fertility Problem

With this change in the fertilizer program, citrus trees on the light sandy soils gradually became less vigorous, leaves turned yellow and chlorotic; production declined.

Through research at the Citrus Experiment Station, Lake Alfred, these troubles were found to be due to deficiencies of magnesium, manganese, zinc, and copper. The organic fertilizer mixtures had supplied limited quantities of these elements as impurities while the inorganic mixtures, being made of relatively pure chemical salts, supplied only the nitrogen, phosphorus, and potash which they were supposed to contain.

Growers were quick to adopt the new fertilizer program suggested, and correction of the once widespread minor element deficiency conditions had pretty well taken place before the January freeze of 1940 occurred.

January temperatures in 1940 were the coldest since state records began in 1891. The mean temperature for the month was 2.1° lower than that of the coldest previous month, February, 1895 ("the great freeze"). Total damage was estimated at $20 million; however, citrus damage represented only a portion of this figure. That greater damage to citrus did not occur may be attributed to the good physical condition of the trees through proper fertilization and to the fact that cool but not freezing temperatures prevailed for the rest of the winter. THE END.

THE RIO GRANDE REPLANTS

Millions of citrus trees replace those lost in three recent freezes

JANUARY, 1930; January, 1949; and January, 1951. These are dates when temperatures as low as 20° F. caused extensive losses of citrus fruit and trees in the Lower Rio Grande Valley of Texas. But the 1951 freeze was the most devastating.

Some portions of the valley escaped severe injury in 1949, and a few orchards produced gross returns as high as $2000 per acre in 1950. However, most of these high yielding orchards were destroyed by the 1950-51 freezes (24° F. in early December, 1950, followed by 19° F. in late January, 1951).

Both the 1949 and 1950-51 freezes caused heavy losses of fruit and nursery stock. Young trees which were frozen to the "banks" in 1949 were rebuilt during the same year, only to be cut back again in 1950-51. Some orchardists paid out eight years of care on these freeze-retarded orchards before receiving any monetary returns from them. Others spent more than $100 per acre per year in an effort to rehabilitate cold-injured old trees that never again produced profitable crops of fruit. A few valley orchards escaped severe injury to the trees, even in areas where temperatures dropped to the 20° level.

The condition of the trees at the time the freeze occurred had a marked effect on the amount of injury they sustained. The defoliation caused by the freeze of December, 1950, resulted in an early flush of growth in most valley orchards. Such orchards were destroyed by the '51 freeze. There were some orchards that were in a semi-dormant state (due to soil conditions) that were only slightly damaged.

10 Million Trees Killed

The 1949-51 freezes caused the untimely death of about 10 million citrus trees having an average value of about $8 each (original cost plus care to bearing age). These freezes also caused the loss of about 5 million boxes of the 1949 and 1950 fruit crops, and reduced annual yields from a high of 28 million boxes to a few hundred thousand boxes in 1952. Total production has not passed the 6 million box figure since the catastrophic freezes occurred.

In spite of all the setbacks, several million young trees have been planted since 1951. THE END.

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Bees to the Rescue!

Novia Scotia growers had trouble getting good fruit sets—until they enlisted the aid of the honeybee

By E. A. KARMO and V. R. VICKERY
Nova Scotia Department of Agriculture and Marketing

A worker bee enters an apple blossom.

PRACTICALLY all apple and pear varieties in the East have to be considered as commercially self-unfruitful. Their pollen is too heavy to be carried by wind. In the absence of insects, no transfer of pollen from one variety to another can take place, and very little fruit will set.

Pollination in Nova Scotia a quarter of a century ago was no problem because up to 50 commercial varieties of apples were grown in mixed orchards. Today the number of recommended varieties has shrunk to six, and the modern trend toward planting large blocks of single varieties has further impeded pollen transfer.

Also, modern farm practices have reduced the areas suitable for nesting sites of bumblebees and small solitary bees, which constitute the chief native pollinating insects. It has become increasingly difficult to procure good fruit sets.

Counts of pollinating insects working apple bloom have been taken in the same six orchards of the Annapolis Valley every year since 1951. Tests for the most efficient use of the honeybees to supplement the native pollinators were tried, and certain recommendations were worked out over the years of 1951 to 1954.

The feasibility of the methods has been proven by the growers, and the use of the honeybees in orchard pollination is expanding rapidly throughout the valley. The insect counts below illustrate the relative change in the pollinating insect composition in the six orchards under study.

Circular No. 67, "The Place of Honey Bees in Orchard Pollination," which enlarges on the material in this article is available to extension workers and others by writing to Horticulture and Biology Services, Nova Scotia Department of Agriculture and Marketing, Truro, Nova Scotia.

INSECT COUNTS PER TREE IN 15-MINUTE PERIODS

	Number Honeybees	Number Solitary Bees	Number Bumblebees
Average, 1951-53	0.9	5.0	2.0
Average, 1954-56	16.5	4.5	2.3

Honeybees are the only pollinating insects which man has so far been able to breed and move around at will. Maximum results from using honeybees for orchard pollination can only be achieved if the operator knows the possibilities and the limitations of this living tool.

Since only pollen grains of the same species can accomplish fertilization, the most effective insect pollinators are those which show

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fidelity to species; they visit and revisit the same species. Honeybees in this regard rank very high and fly very low. Bumblebees and solitary bees come fairly close to honeybees.

In the honeybee colony there are two groups working in the field—the scouts and the foragers. The scouts search for sources of nectar and pollen in locations not previously worked by the colony, or where a new species is coming into bloom in an area well-worked by foragers for another species. The location, quality, and quantity of any worth-while sources are reported back in the hive, and the best of them will be worked over by the foraging group.

Nectar: Sweeter the Better

The quantity and sugar concentration of the nectar of different plants varies considerably. Temperature and moisture have a great effect upon secretion and concentration of nectar. Dandelion nectar is higher in sugar than apple nectar and is secreted freely at lower temperatures. The honeybees can distinguish between nectars showing a 5% difference in the sugar content, and invariably they prefer the sweetest solution. This appears to be the determining factor in the preference shown by bees to certain plants.

A varietal preference is also noticeable. Wagener is visited more freely than McIntosh or Gravenstein. Variation also occurs within varieties due to soil, slope, availability of plant food, and similar factors.

Each foraging bee works a small area, called the fixation area, and remains faithful to a single species in that area until the source becomes depleted as the bloom period comes to a close. The fixation area appears to be determined by the number of flowers and the abundance and concentration of the nectar provided by the flowers.

Must Feed the Babies

The driving force behind the foraging activities is the demand of the huge nursery inside the hive. There may be 10,000 to 30,000 adult bees in a populous colony at fruit bloom. However, their food consumption is modest compared with the flood of food that must be given to each of the 10,000 to 30,000 "babies in the cribs."

Each baby requires about 10 loads of pollen and many more loads of nectar to grow from egg to adulthood. Stored honey may be used to meet the demand for carbohydrates, but fresh pollen must be gathered to supply the need for proteins. Pollen is so important to the

(*Continued on page* 44)

Get the "Bugs" before they get your fruit . . . with

WISCONSIN-POWERED

Orchard Sprayers

The John Bean Division of Food Machinery and Chemical Corporation, Lansing, Mich., specifies Wisconsin Engines for many of their orchard and grove sprayers.

A 36 hp. Wisconsin Model VG4D Engine supplies dependable power for a big volume, high velocity air stream on this Hardie sprayer, made by Hardie Mfg., Hudson, Michigan.

IN the never-ending "battle of the bugs", your chances of winning are best when you employ the most efficient and reputable spraying equipment for this vitally important job.

And of prime consideration, regardless of the make of sprayer you buy, is the *power unit*. Wisconsin engine power gives you these important advantages:

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AIROSPRAYER COMPANY
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BEES

(*Continued from page* 43)

bees that they will take advantage of even slight respite in otherwise poor weather to add to their supply.

In an average colony in the spring, new bees are emerging at a rate of about 1000 per day. This releases an equal number of "house bees" for outside duties. Many of these bees follow the advice of the scout bees, which are continually seeking new sources to be worked. The older field force gradually becomes depleted, and younger bees work a wider area.

When a colony is moved to a new location some miles away, the bees are deprived of their old pasture. The scouts immediately begin searching for a new source of supplies. This could be the same plant species as worked in the old location, but usually it is the best source close to the hive.

If bees are being moved to an orchard for pollination, make sure that the scout bees find the crop where cross-pollination is desired. To ensure this, the following conditions should be met:

1) Pollen and nectar must be available from apple bloom in the orchard. Bees should not be moved in until there are enough flowers open to provide an attractive source.

2) Colonies must be placed in a sheltered but sunny place in the orchard.

3) If the colonies are evenly spaced throughout the orchard, the distribution of foraging bees is more even than when the colonies are placed in a single location.

Colonies on permanent sites are effective pollinators only when the bee population is dense enough so that all available sources within the flight range will be worked. Bees of these established colonies will be found on any attractive source within their range of 1½ to 2 miles. Only a certain proportion of the bee population will be working the orchard in question, and if the other sources are more attractive, this proportion may be rather small.

The number of colonies used in orchard pollination need not be large if the colonies are strong and they are moved in when the bloom is attractive and the weather is suitable for bee flight. One colony may adequately cross-pollinate several acres in a single afternoon if compatible pollen is available.

The supply of suitable pollen usually is provided by setting out mixed varieties, interplanting pollinizing trees, grafting limbs into trees, etc. This pollen must be viable, compatible, and available at the time when the flower stigmas are receptive.

Processed pollen placed in exit of beehive clings to bees and is thus carried to blossoms.

Even where pollinizing varieties have been planted, there may be cases when suitable pollen is lacking. This may result from the varieties present not blooming together or not being compatible; the anthers not shedding pollen, or the pollen shed not being viable because of damage from rain, frost, or other conditions. Without suitable pollen even a high insect population working the bloom will not effect pollination. These cases can be corrected by supplying pollen.

Because of the rather limited foraging area of an individual honeybee, which in the case of fruit trees does not exceed one single tree or sides of adjacent trees, the pollinizing varieties should be so planted that every tree is adjacent to a pollinizing variety (at least every third tree in every third row). The slight overlapping of the working areas of the individual bees which does occur will, in mixed orchards, effect the transfer of pollen from pollinizing trees to trees to be pollinated. There is also some transfer of pollen from the hair-coat of one bee to the hair-coats of others due to brushing together within the hive.

FIREBLIGHT CONTROL IS 'BEES' KNEES'

To prevent orchard pollinating bees from spreading fire blight to apple and pear blossoms, Dr. Robert H. Daines, plant pathologist at Rutgers University, has come up with the idea of making the bees carry the cure instead of the disease.

He places streptomycin dust in a simple wooden trap inserted at the beehive entrance. The bees can't get in or out without walking through the antibiotic dust, which clings to their bodies ready to kill or inactivate any fire blight-producting bacteria they might pick up as they gather nectar.

In controlled greenhouse tests Dr. Daines and his associate, Dr. Michael Sroinik, of Cornell University, succeeded in reducing fireblight infection of pear blossoms from 40% to less than 1%. The method will be orchard-tested this season with the assistance of Merck & Co., Rahway, N.J., manufacturers of the streptomycin product, Agri-Strep.

Supply 'Processed Pollen'

Whenever pollen for cross-pollination is not available, it can be sup-

plied by the grower, usually in the form of "processed pollen" which is commercially available. This pollen may be transferred to the blossoms in various ways.

1) **By hand.** It requires about 40 hours and a minimum of 2 ounces of pollen to hand-pollinate with a brush an acre of mature apple trees.

2) **Blast pollen into the trees** with a shot gun, employ air blast, etc. This is a rather costly and wasteful method.

3) **Hand-pollinate a small percentage of the blossoms** of each tree and provide a good bee force to disperse this pollen over the whole tree.

4) **Pollen inserts** can only be used in conjunction with beehives. Pollen is placed in the inserts in the passageway of the outgoing bees, and they carry (unintentionally) small amounts of this pollen to the blossoms which they are working. This is the most economical method of transferring processed pollen. Under favorable conditions 1 or 2 ounces should be adequate to pollinate 1 acre. We have had very good results using much less than this amount.

The pollen in hive inserts appears to stimualte bees to greater foraging activity. Our observations have revealed that outgoing bees gather small amounts of this pollen, return to the hive, and apparently perform "pollen dances" before leaving in search of similar pollen. Such a colony will send out a large number of foraging bees.

Pollen should be provided in the trough of the insert when the bees emerge from the hive on the initial flight in the new location. Pollen soon loses its viability under orchard conditions, so it should be replenished every hour or two while the bees are flying.

This apparent stimulatory effect is especially noticeable in colonies supplied with pear pollen for cross-pollination of pears. Normally bees do not like to visit pears as the nectar is strong and pungent and low in sugar concentration. However, when pear pollen has been supplied, the bees will visit pears readily to gather pollen and will effect a high rate of cross-pollination and subsequent fruit set.

As the bees spread out from the hive location to cover their flight range, the practice of "colony rotation" has been adopted. Colonies are left in an orchard for a day or two, then moved to a new location at least 1½ to 2 miles away. They are replaced with other colonies from this or another location. Thus, a working force is maintained within a small area as the succession of varieties bloom. THE END.

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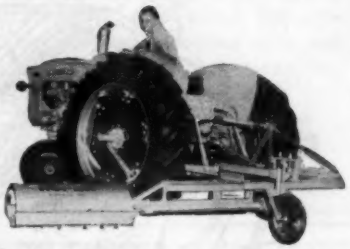

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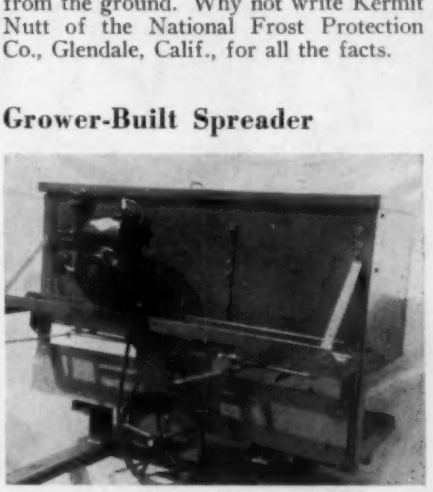
Grower-Built Spreader



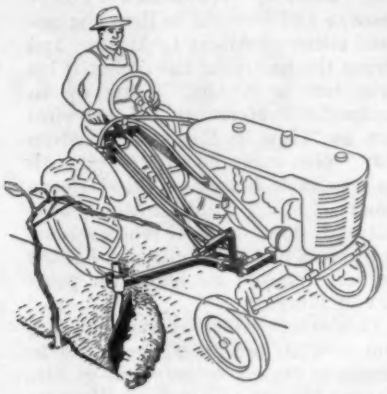
Out in Sodus, Mich., long-time fruit grower Harold Skibbe decided to build his own fertilizer spreader because none of those on the market did the best job for his fruit. With grower ingenuity he built a spreader which fits on the back of his tractor and actually meters the fertilizer onto the ground. Now growers everywhere can have one of these spreaders at a remarkably low cost. Why not write Harold Skibbe, Sodus, Mich., for details; he'll be glad to send you all of the reasons why a Skibbe spreader can save you time and money. The photograph above shows the gas engine-powered

- **Wind Machine**
- **Tractor Hoe**

model which is modified to USDA pest control specifications.

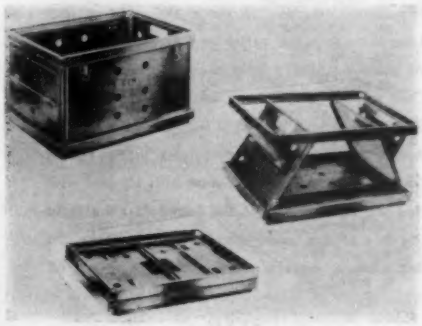
Hydraulic Tractor Hoe

In the Hudson Valley growers are cutting costs and doing a better job with a new hydraulic tractor hoe. Made of one frame of heavy metal with one point hitch, the new hoe fits any tractor and operates hydraulically. I've tried the implement, and the one-lever control next



to the tractor steering wheel makes it a simple matter to maneuver in the tightest places. Other attachments are available, such as a disk, roto-tiller, weed mower, and cultivator. Why not learn more about this unusual and useful tool—write Howard Green, Howard C. Green Mfg. Co., Portland, N. Y.

Folding Aluminum Crate



Growers on the West Coast are using a new bushel lug which is saving money, time, and space. The new crate is constructed of long-lasting aluminum and snaps open to full size easily. After the fruit has been stored or delivered, the lug can be snapped shut and returned to the grower. Light in weight and almost indestructible, these new crates are what you have been looking for. Write to J. M. Gordon, J. M. Gordon Co., Inc., 1740 Standard Ave., Glendale 1, Calif.

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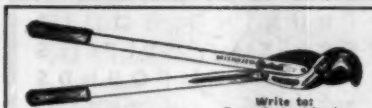

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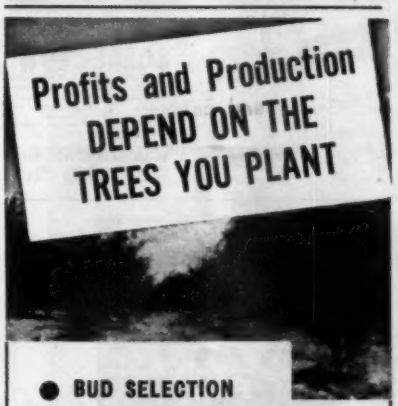

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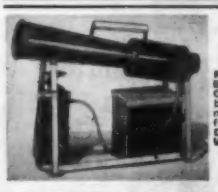

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By HENRY BAILEY STEVENS

An Oscar for The Orchard Poet

LONG before there was a Windfalls column, AMERICAN FRUIT GROWER had brought to light the unusual talent of Albert L. Mason; and during the past year has collected his verse into a booklet, "Song of an Orchardist." Here are old favorites such as "How to Spray the Modern Way," plus many new ones—all with the inimitable humor of this Orleans County (N.Y.) fruit grower whose quizzical, down-to-earth observations on life in a modern orchard are about the best antidote we know for post-harvest blues.

This month when we turn the column over to the poets, we'd like to present at least a verbal oscar to Mr. Mason, Master of Orchard Rhymes. His book (it can be obtained from AMERICAN FRUIT GROWER for only a dollar) is something to keep handy on the shelf to refresh your sense of perspective whenever there's need.

GETTING DOWN THE WALNUTS

By John D. Kendig
(Manheim, Pa.)

Did you ever shake the walnuts down from the very top of the tree
And hear them splatter upon the ground as merry as they could be?
Sometimes you have to dodge the nuts as they come whizzing by
Like shots from an aerial gun fired at you from the sky.
At other times they drop so slow or don't let go at all
That you get plumb wore out up there, trying to make them fall.
So then you stop to rest a bit and gaze out far and wide
Across the tops of the other trees to the rolling countryside,
On off to the woods and distant hills all gold with poplar trees
And the flaming reds of the dogwoods a'flutter in the breeze.
It's lots of fun each autumn time to shake the walnuts down,
But when it comes to shelling them, I beat it off to town.

SEED

By Myrtis L. Ellis
(Rincon, Ga.)

I know a tiny little seed
Holds the magic mystery of God;
Each reproduces true to kind
If placed beneath the sod
And given warmth and light and rain.
Some secret is revealed
When roots go down and plants come up,
But why? God keeps concealed.

Great minds and money have improved
The seed we put in the sod,
But time, money, nor minds of men
Have solved this mystery of God.
Dear God, we thank you from our hearts
For your gift of Life and Seed.
May we fit into your scheme
And, like Nature, your warnings heed!

UPROOTED

By Alice Burghart
(New Smyrna Beach, Fla.)

Upon a beach where many sit and wait,
Do they stay dreaming of a garden gate
Left open for the time of their return?
Or do they watch the smoke while bridges burn?

How can one love a lonely stretch of sand
Remembering soil so velvet in the hand
Or emerald grass beneath the apple trees?
The flesh remains, but what of memories?

BLAZING WILDFLOWER

By Margaret Nelson
(Devil's Lake, N.D.)

Blazing wildflower,
You are a fire hazard there in the dry field.
Those zombie grass-stems would leap gladly in your warmth.
I shudder to think what might happen
If a wind came.

THREE POEMS

By Eunice Branum Souder
(Augusta, Kans.)

Down to Earth
My little boy has a house
On a bough in the plum tree;
He clambers up and sits there,
His own big world running free.
Even so, he's proud as punch
When I call him in to lunch.

Introspect
The world is wide and deep,
Eyes of our minds behold:
Winter awakes from sleep,
And Spring's content is bold.

Orchard Magic
Petals of pink and white,
Tinted apple blossoms
Shape a carpet of light fragrant
Pink snow.

SPRINGTIME VISION

By Mrs. Lester Livingston
(Shepardsville, Ind.)

The night was bright with moonlight,
The garden fresh with dew,
As arm in arm down the garden path
Strolled the lovers two.
She was small and dainty
In a dress of dotted red;
He was dark and handsome,
A gentleman well bred.
They stopped there in the moonlight
And began to kiss and hug,
But he was just a cricket
And she was a lady bug.

AGED BEAUTY

By Delphine McGrosso
(Arkport, N.Y.)

Old apple trees 'long orchard fences
With bowed, distorted branches point
To years of lushful bearing
With every gnarled and knotted joint

Like unto aged men they seem
Whose years of fruitful toil well spent
In love's sweet labor shared in full
For those with whom through life they went.

As minds and limbs and backs are bent
And only memory retains
The years of care, peace, and content
Like beauty with the old remains.

Who Helped Me Most? IT'S good to think back once in awhile and give credit where it's due. An unexpected helping hand over a rough spot, a word of counsel, perhaps a sharp rebuke that set up a new train of thought may have made a profound difference. We'd like to hear of interesting examples. What sticks in your memory as an unusual piece of influence, affecting your whole career as a fruit grower? A Windfall for the best reply!

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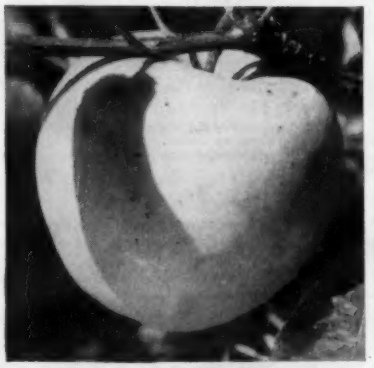

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SPRING FROSTS

Peach growers in the Southeast know the value of a good site

By E. F. SAVAGE
Georgia Experiment Station

LATE spring frosts are the greatest natural hazard to the southeastern peach industry. They are often severe enough to destroy the entire crop in certain sections, sometimes as late as the shuck-off stage of the young peach.

Area-wide crop losses have taken place only four times since the start of the southeastern peach industry. These occurred in 1828, 1849, 1894, and 1955. Very little can be done during these major freezes, but it is possible to decrease losses from minor freezes.

Site Is Important

Every spring some frosts occur in nearly every orchard. In well-located orchards these light frosts are helpful in thinning the crop. In poorly located orchards the temperature may be low enough to cause the loss of the crop. Because of this, the procedure has evolved of planting only the tops of the rolling Piedmont hills and making sure that higher ground from which cold air could drain is not in the immediate vicinity of the orchard site. Rapid air drainage is essential. Underbrush in surrounding woods, weeds, and small bushes along fence rows are kept cut off. Even this small brush is sufficient to dam up the downward flow of cold air.

Growers make it a policy also to go over the land of a prospective peach orchard site early in the morning when frosts occur to find out how high on the hill the frost line lies. Planting below this frost line is not advisable, since, in as many as three years out of five, the fruit on these trees in low locations is destroyed by late spring frosts.

In the more level peach growing sections of the coastal plain, as for example, the Fort Valley plateau, a difference of 1 or 2 degrees in temperature determines whether or not a grower has a crop. Growers in these areas have found that the temperature over a firm-packed soil or over a bare soil will be from 1 to 3 degrees higher than over a recently cultivated soil or ground on which a cover crop is growing.

The orchard practice in these flat lands is to clean-cultivate the orchard in late January so as to de-

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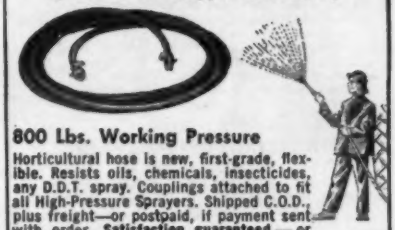

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One-year-old peach tree planted in January, 1955. Photo taken April 8, 1955, eleven days after Big Freeze shows killing back of shoot growth. Damage to trees in 1955 was not as great as at first suspected, and only trees planted the previous year or two were killed.

stroy all winter weeds and yet leave time for rains to pack the soil so that advantage may be taken of this temperature difference. This coastal plain area with its climate influenced by the Atlantic Ocean seldom misses a crop, but even here the aforementioned practices must be followed. In addition, avoidance of planting low places which are spotted through some of these peach growing sections is necessary.

The Effect of Cover Crops

Cover crops in peach orchards are valuable soil conservers. All things being equal, it is generally conceded that cover crops will increase the productivity of an orchard. Recently we have had to re-evaluate our thinking along these lines. Following a series of late spring frosts, yields of trees over heavy cover crops of rye or crimson clover are usually only one-half that of trees under which the soil is bare and hard-packed. Since frost-free years are rare, winter cover crops are not practical in bearing peach orchards in the Southeast.

Winter cover crops may be used advantageously in growing off young peach orchards, since they grow well when the trees are small and are highly beneficial to the soil. One other benefit of these covers is that the temperature over them is usually low enough to kill the blossoms and young fruit on these one- or two-year-old trees. This does away with the necessity of thinning these fruits off these young trees.

Larger trees than are normally grown in the Southeast are becoming more popular with some peach growers, especially in the Piedmont section. The idea is that the tops of these larger trees will be above the frost lake, and some production will be possible. THE END.

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HENRY LEUTHARDT

Port Chester New York

American Fruit Grower

RICHARD T. MEISTER, *Editor*
H. B. TUKEY, *Associate Editor*

• *Fruit for Health* •

Good-by, Grapes of Wrath!

THANKS to modern mechanization, a fruit grower and his family with little outside help can produce a considerable quantity of fruit.

But when it comes to harvesting this fruit, the operation becomes too big for the average family to handle. Harvesting is still largely a hand operation. This is the bottleneck in the fruit industry which has been eased, but not yet eliminated.

For the present, we are dependent upon transient labor, which has become a highly specialized labor force. There was a time when harvest labor was considered the cull labor of industry. Too many people in cities still think this way.

That was the era of poor housing, poor social conditions—the "Grapes of Wrath" era. But now the turn has been made, and harvest labor is being gradually recognized as a small army of skilled workers.

These workers understand the problems of harvesting a perishable commodity. They adapt themselves to the long hours and the hard work out of doors. They do a good job. Many of the families come back year after year. They have become an integral part of the fruit industry.

ACEROLA—The Puerto Rican Cherry

IMAGINE a fruit with 1800 milligrams of vitamin C per 100 grams of fresh weight—compared to the orange at 60 and the apple at 10 to 20!

This is the Acerola, or Indian Cherry, called "Puerto Rican Cherry" by Director Arturo Rogue, at Rio Piedras, who sees a promising future for this fruit on the islands of Puerto Rico. Already a program is underway to improve the fruit through breeding, selection, and other culture.

The juice is now being used primarily to fortify synthetic and less fortunate natural fruit juices with vitamin C. The demand is excellent, prices are good, and the immediate future looks bright.

All of which is just another illustration of the growing importance of fruit crops to the world, and of the increasing competition from all sides.

Fortunately for fruit growers in the United States, the free use of fruits is associated with a high economic level. May it continue this way, and may the variety of fruit products offered Mrs. Housewife continue to increase and multiply.

Milk, Labor, and Crop Control

THE newspapers have been full of stories about sporadic milk strikes across the country. They have also featured the dock strike in New York. The two make an interesting study in contrasts.

On the one side is a group which is by temperament unused to violence, which lives in harmony with nature, and which finds it impossible to turn off a faucet on the cow and control the supply of milk. Further, milk is perishable.

On the other side is a group which is capable of violence, which has lived at the mercy of the man who hires, and which can stop delivery by the wink of an eye.

This is the difference between agriculture and labor. It is why it is so hard for the two to see eye to eye. It is also the reason why crop controls are so difficult to set up and to enforce. The whole thing is different, and we may as well remind ourselves of it from time to time.

Fruit Growing is Such Fun!

Fruit Talk

In spite of all that is said about **yellow-fleshed peaches,** Kentucky fruit growers report good demand from white-flesh sorts for local markets—25% of the planting **will be white,** say some.

The origination of peach varieties with **short chilling requirements** is dropping the peach belt southward, even into **northern Florida,** reports J. T. Bregger, of Clemson, S.C.

Apple growers could set out three to four new 20-acre orchards each week and still just keep up with **population growth,** which needs **2 million more bushels** of apples each year—says *Apple Research Digest,* of Yakima, Wash.

A **tilt-up concrete storage** for controlled atmosphere is under study at Michigan State University, the wall panels of the building having been poured on level ground, cured, and then set in place with a **mobile crane.**

The severe **surface discoloration of pears** packed non-wrap in fiber-board containers has been found due to bruising and rubbing in transit. It can be all but eliminated by the use of a **compression pad** in the container, according to **Noel F. Sommer of California.**

Average production of southern **California oranges** has dropped from 370 to 265 field boxes per acre for navels, and from 290 to 265 for Valencias over a 12-year period. There are other factors, but the chief one responsible is **smaller size of individual fruits.**

Florida produces 81% of the total grapefruit crop.

The **strawberry** continues to gain. The 1956 crop was **40%** above the 1949-54 average. Approximately **44%** was produced in **California.** Of the national crop, **55%** was procesed in 1956, representing a gain of more than **20%** over 1955.

The color work in the nursery catalog of **George Delbard of France** is something wonderful to see. A glance through the catalog finds such American varieties as Jonathan, Stayman, Golden Delicious, Delicious, and Winter Banana **apples,** Red Lake **currant,** and Mayflower and J. H. Hale **peaches.** American pears, plums, and small fruits are noticeably absent.

Quality and **conveniences** dominate the American market. "Choice" beef averaged 38% of the market in the 1920's and now accounts for almost 60%; much of the 70% increase in per capita eating of chickens since the war is credited to convenience packaging.

—*H.B.T.*

Coming Next Month

Small Fruits Issue

- Plastic Covers for California Strawberries
- Better Strawberry Yields Through the Hill System
- Fumigating Berry Soils for Nematodes
- How to Grow Black Raspberries for Profit
- Blueberries—from Cuttings to Fruit
- New Cultural Practices Boost Currant Yields

The dashing new Corvette (left) and the Bel Air Sport Coupe.

Chevy puts the purr in performance!

That new V8 in the '57 Chevrolet is as quiet as a contented cat and as smooth as cream. And it's cat-quick in response when you ask for action!

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